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Another Manufacturer adopts

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Since Mahon first started fabricating *Welded* Steel Bases and Frames for the machine tool industry, scores of other industries have investigated and adopted the many advantages that *Welded* Steel Plate Fabrication provides. Lighter—stronger—smoother in finished appearance—it is, in most cases, less costly, also. Reduces scrap and saves on machining costs.

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Fabricators of Machine Bases and Frames and Many Other Welded Steel Plate Prod

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Postwar Exports

(Cabled from London)

ONE of the fundamental differences between the British national economy and ours in the United States is that we make elaborate plans and promises which are often unrealized, whereas here the plans are first set down formally and then publicized. But the necessary results are generally accomplished. The reason for this may be that our voting public possesses a greater percentage of gullibility, and our politicians have capitalized this by creating castles in the air to be viewed and admired rather than lived in.

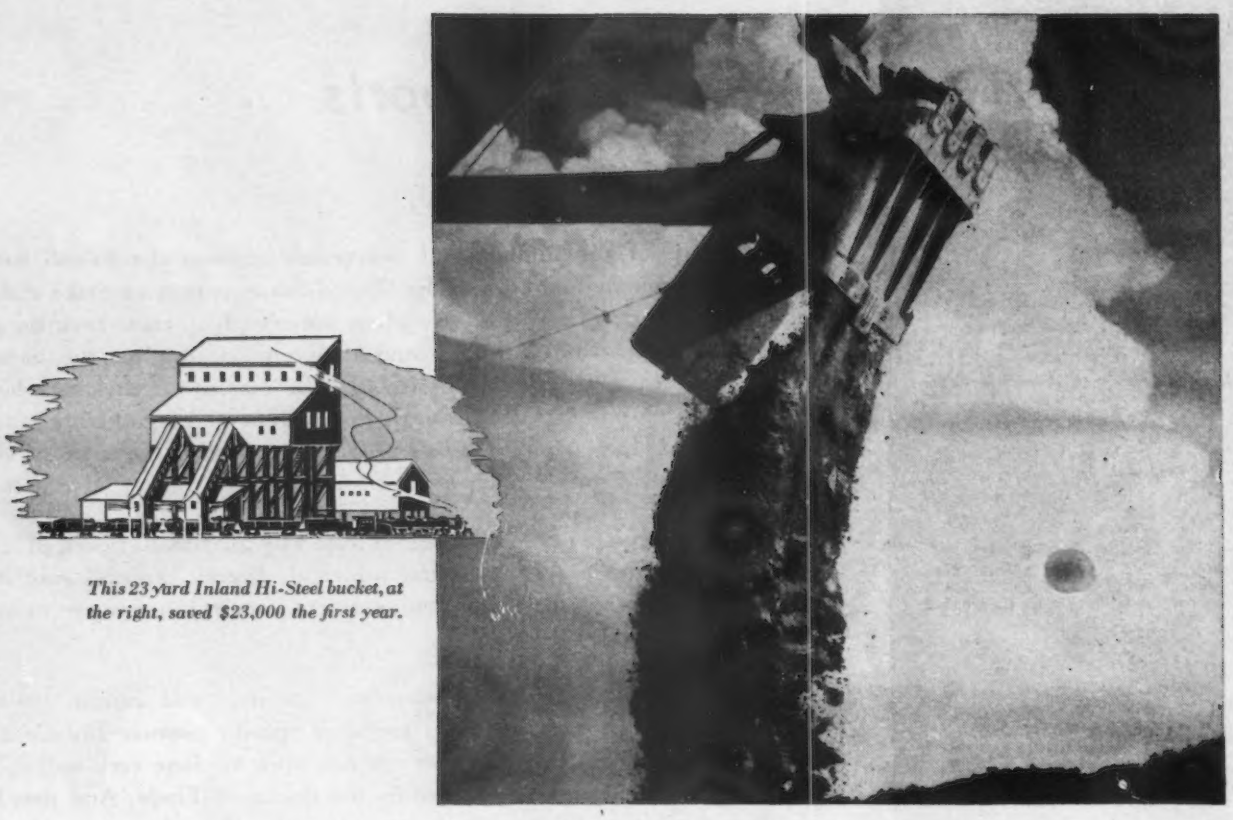
This explains to some extent at least why the British Board of Trade, which during peacetime is the powerful, overall business rule maker of England, has made no announcement concerning postwar or reconversion plans.

Several scores of industries, such as steel and cotton, have put committees to work on plans for their specific postwar situations, but these cannot be put into effect nor can work be done very well to help effectuate them until approved by the Board of Trade. And that body has a habit of filing such documents and taking them up when they get around to it.

As a result of this and of the idea prevalent here that American postwar plans have been completed in detail, there is considerable grumbling by British employers and labor. The fear is that the day after Germany capitulates, salesmen for American concerns will pop up in all countries of the globe and begin taking orders. This accounts for the silly, current report that American salesmen are now following the battle lines on the continent. There are quite a few of our salesmen there but they are shelling; not selling.

Britain does have more to worry about than we do, and no one can blame the British for doing so. The rebuilding of destroyed property plus additions for the natural increment of floor space is estimated as requiring the equivalent of 10 years' work for a million and a half workers. British colonies are becoming more and more industrialized and self-contained, and the workers want better wages and protection "from the cradle to the grave."

England will solve this problem as it has solved previous ones by doing one thing at a time. But it will necessitate mergers to secure the increased efficiency of larger units and the removal of existing price protection of marginal producers.



This 23 yard Inland Hi-Steel bucket, at the right, saved $23,000 the first year.

A BUCKETFUL OF COST LOGIC!

Facts and figures prove advantages of using Inland Hi-Steel where light weight and high strength are needed.

The records maintained at Maumee Collieries show that when Inland Hi-Steel replaced material formerly used these important advantages were gained:

(1) The first cost was 40% lower.

(2) Maintenance was cut in half.

(3) Weights were decreased as much as 32%.

(4) Capacities went up an average of 51.6%.

The cost logic behind the use of Inland Hi-Steel was summed up by a Maumee official when he said, "We estimate that our 23 yard Inland Hi-Steel bucket saves three tenths of a cent a yard over the bucket previously used. In one year this 23 yard bucket moved 7,671,000 cubic feet of overburden at a total saving of $23,000."

Scores of products and processes for war and peace are utilizing the corrosion-resistant, abrasion-resistant, high-strength and light weight characteristics of Inland Hi-Steel. Write us if you would like further information.

Inland Steel Company, 38 South Dearborn St., Chicago 3, Illinois. Sales Offices: Cincinnati, Detroit, Kansas City, Milwaukee, New York, St. Louis, St. Paul.

INLAND
Hi-Steel

The IRON AGE
October 10, 1944

NEWS FRONT

► The Combined Production and Resources Boards are being charged in some quarters of attempting to perpetuate themselves in the postwar period after having discharged their wartime duties of correlating United Nations' industries.

Accusations have been made that the Combined Boards have made far-reaching postwar agreements, many of which are disadvantageous to the United States.

► Tight OPA price controls may be expected during the early reconversion period. Prices established before manufacturers entered war production will be maintained unless OPA authorizes an increase.

► Kaiser's Permanente Metals Corp. is shipping ferrosilicon from its magnesium plant to the Pittsburgh territory. Competitors are a little baffled by the activity, as the prohibitive freight rate plus high original costs preclude any profit on the transactions.

Kaiser's sales office at Akron will shortly be supplemented by a new office in either Pittsburgh or New York, to sell magnesium products and ferroalloys.

► Some of the automobile companies may specify three or more SAE low-alloy steels upon the basis of hardenability to replace more expensive high alloy steels, for the postwar car.

And: Some of the steel mills may meet these hardenability specifications by adding to melts the excess stocks of alloy scrap in the market, with final chemical analysis being a secondary consideration.

► Coarser wire, coated with zinc either hot dip or electrolytically, and then drawn down to fine sizes, has enabled wire suppliers to more consistently meet Signal Corps specifications of 35 gm. of zinc per kg. of wire. This practice has shifted the bottleneck of supply from the galvanizing to the draw bench department.

► On V-E Day (Victory in Europe), which is looking more and more as if it will be next spring, war goods orders will have been cut back by about 40 per cent on a national basis. In some areas this will be as low as 25 per cent and in others as high as 85 per cent. It will run to about $30 billion a year.

Cutbacks will be sudden as Congress forbids making military goods to create employment. Cutbacks will be on everything but chemicals, forest products, and textiles.

The cutbacks will release so much material and facilities that peacetime output will be beyond any previous volume, despite the fact that war production to prosecute the Japanese war will average $65 billion a year.

► Plans have been completed so that agents in Australia of American small tool manufacturers will receive commissions for lend-lease shipments to the Australian government equal to those they would normally have received in handling commercial shipments.

Similar arrangements have been made for Australian representatives of American machine tool builders and agreements are now being negotiated for those handling typewriters and locomotive frames.

► One major electric furnace operator has found that Sillimanite roofs outlast conventional silica roofs three to one. The Sillimanite roof also gives more warning prior to failure than the silica roof.

Other electric furnace plants have found that increasing the space around electrodes has resulted in longer roof life, whereas previously it had been thought that such increased space would favor increased flame erosion.

► England is greatly concerned with its 50 per cent increase in steel costs and deterioration of equipment during the war, as factors depressing its postwar competitive position.

Likely, the government will step in to give high priority for re-equipment, and may develop some measure of price fixing along the lines already laid down for the cotton industry.

New Developments In Die Materials

By RICHARD BREDENBECK
Advance Tool & Die Co.
Cleveland

o o o

THE war with its tremendous industrial applications has affected the development of practically every branch of the metals industry. Some branches have had to work with substitute materials, others had to increase their output to quantities previously thought of as astronomical, and again others had to tackle practically impossible tasks, which 10 or 15 years ago no one would have considered as practicable.

The sheet metal stamping industry, and therefore the closely related die industry, may be counted in the last mentioned group. In order to overcome some of the practically insurmountable difficulties with which the die engineer was confronted on various occasions, an intense search was touched off for new and better materials for the construction of dies. It is only necessary to think of a few specific cases in order to obtain a picture of the problems which required solution. Probably the most demanding problem was the steel cartridge case, followed closely by operational problems involved in the forming and drawing of all the new light metal alloys, stainless steels, etc.

The writer was first confronted with a lack of knowledge concerning the actual strength, especially the impact strength, of the available tool steels when comparing one with the other. Since the tables of physical properties which are put out by the various steel companies are not made uniformly to one standard, a true comparison of one steel with the other was only possible either by the long method of observing actual production results or by laboratory experiments. The latter course was taken, keeping in mind the desirability of immediately putting the result of the experiments into practice and further checking them under actual production conditions. By doing this a very extensive chart was developed, which compared the impact strengths of a great number of available tool steels.

Several other materials not usually classified as tool materials were checked and some very important characteristics were found for some of them. Some of the higher alloy SAE steels showed double and triple resistance to breakage as compared with even the strongest tool steels. It was readily seen that these materials could to a great advantage be used in the construction of dies, even in preference to some of the expensive tool steels which had previously been thought the best materials for high production tools.

Of course, care was necessary in the construction of dies to assure usage of the proper material in the proper place. As an example, it would be foolish to try to make a cutting die or punch, which cuts thin sheet metal, out of the extremely high strength SAE 4340 steel and expect a long life and sharp cutting edge. On the other hand, through these tests it was shown that it is also foolish to construct a spring pad or a die part, with very weak cross-sections subjected to high pressures, out of high-grade tool steel such as high chrome-high carbon, or high speed steel, or some of the lower alloy grades.

As the result of experiments, a considerable number of steels were added to the long list of die materials, many of which are available at a cost 15 per cent to 30 per cent of the tool steels previously used. The die engineer can with great advantage use these lower priced materials, both economically and in a qualitative way, measured by the length of tool life. The high-hardening, nickel-bearing alloy steels of the 3200 and 4300 series have, therefore, definitely found their place among the important materials for die construction.

One Example Considered

The rather common spring-pad used in form and embossing dies has been a constant source of trouble in the production press room. A self-contained die, with springs built right into it, is in most cases preferred by the production department. It can more easily and quickly be set up than the die with pressure-pins operated by air cushion or spring pad attached to the press.

On a die with limited shut-height, this part is usually drilled full of large holes commonly called spring pockets. Therefore, some cross-sections get fairly weak, and in order to eliminate breakage in production a soft piece of steel is generally used. If the pad has to perform any other work than just holding the sheet flat, hardened tool steel parts must be made and inserted into the soft base.

The die engineer can readily see the advantage of making these die parts from a single piece of steel which can be hardened throughout and still maintain a strength which makes it practically impossible for breakage to occur, instead of employing many intricate inserts of hardened tool steel

in a rather soft base. Many forming punches, which by the nature of the stamping which is formed have no tendency for "galling" or "pick up," and which have weak forming edges, can be made with great advantage from such a steel. These punches will, because of their exceedingly high shock resistance and fatigue value, outlast practically any material classified as tool steel.

They also have proved their worth on die parts, especially compound punches for blanking heavy-gage, high-alloy sheet, such as SAE 4130 and SAE 3140 steels and high-carbon sheet of about 0.35 or more carbon. In one case, where a special wrench was blanked from SAE 4130 sheet, ⅜ in. thick, where the cross-sections of the compound punch were very delicate considering the stock thickness, an SAE 4340 punch, hardened in oil and tempered twice at 325 deg. F., was used after all the available strong tool steels had failed.

In using this kind of material, it must be kept in mind that a punch with a hardness of around 53 to 55 R_c is subject to considerable wear during heavy blanking operations. In addition, all nickel-bearing steels have proved to have a tendency to pick-up or gall very easily, especially if used with that low a hardness. To overcome this the die parts can be flash plated with hard-chromium. Since the base-material is not up to the recommended hardness of 59 R_c or more, the thickness of plating must be kept to a minimum in order to avoid cracking and flaking of the coating. A hard-chromium deposit of 0.00025 to 0.0005 in. has been found sufficient to protect the relatively soft surface of the punches from excessive wear and pick-up.

Work of an interesting nature also has been done in connection with *tool steels.* Materials, which were previously used on special operations only, where their comparative strength was the major issue, have now been adopted to a wider range of work. Through special heat treatment, these materials have been given quite desirable characteristics.

The search for a suitable punch for the drawing of the steel cartridge case has furthered this phase of development.

It was found that a combination of physical properties, which were not represented in any one steel under normal treatment, was needed to "lick" this job. Since it takes from 30 per cent to 50 per cent more power to draw the steel case than it takes for the brass case, a considerable stronger punch was needed. In addition, steel has of course a much greater tendency to gall or pick-up, that is welding of the drawn metal to the surface of the punch or die. To overcome this difficulty a punch of higher hardness was needed. At the same time the higher pressures, which developed during the process of reducing the wall thickness in the draw operations, produced much greater abrasion on the punches than had been the case for similar brass parts. To summarize it all, a punch was required which possessed both an exceedingly strong case and a super-hard surface which permitted no metal adherence during stripping.

. . . The correlation in chart form of the impact strengths of a great number of die materials has resulted in substitutions not previously made. The result has been dies of much longer life for certain operations, which show no pick-up and which run without touch-up for much longer periods.

Practically all tool steels were tried without outstanding success. The punches made from the stronger steels, due to the low surface hardness, picked-up and galled as soon as they were put in operation. Punches made from steels which could be hardened to 63 R_c to 65 R_c had too low an impact strength and broke after a few hundred pieces. After a complete analysis of the facts presented, the writer tried a trial punch made from one of the strongest of water-hardening steels, analyzing: 0.50 C, 0.40 Mn, 1.00 Si, and 0.50 Mo.

Eliminating the Worst Enemy

This punch was given a flash-chrome plate of 0.0005 in. thickness on each side after complete machining, hardening, grinding, and polishing. The tool steel itself underneath the thin coat of plating material showed a hardness of 59 R_c to 61 R_c. With this punch production was boosted to 185,000 pieces per punch. In order to overcome the scarcity of tool steel of one brand and size, various other kinds were tried, and a very desirable characteristic was discovered in one of the steels analyzing: 0.50 C, 1.25 Cr, 2.75 W, and 0.25 Va.

This steel, when quenched in oil hardens to about 60 R_c, which gives a good, hard backing for the chrome plate. Upon examination of the causes for final failure of these punches, it was found that the fine layer of plating material, because of continuous pounding and slight deflections due to inaccurate cups from the previous draws, was flaking off in some spots and causing immediate galling. The next objective was to get away from chrome plating.

The only two other commonly known methods to produce an extremely hard surface on a somewhat softer but very strong core is carburizing and nitriding. Both of these were tried. The last-named steel was carburized, resulting in a surface-hardness of 64 R_c to 66 R_c with an exceedingly smooth and slippery surface. Special wheels had to be used for the grinding operations. The punches obtained this way produced as high as 250,000 pieces without much polishing while in operation. They showed a high resistance to both galling and wear.

To select the best material for nitriding was not very difficult. The chart for impact values previously mentioned quickly showed the strongest steel within an analysis group which made nitriding possible. A steel was selected which analyzed: 0.95 C, 5.25 Cr, 0.50 Va and 1.15 Mo. It was found that punches made from this steel, when hardened at 1825 deg. F. instead of 1800 deg. F., maintained a hardness of 61 R_c to 63 R_c after tempering at 950 deg. F. for 8 hr. The long draw was necessary to relieve all strains prior to the finishing operations. The punches were nitrided at first at 940 deg. F. in a 40-60 per cent potassium-sodium-cyanide bath for 12 hr., and later on in a nitriding box with ammonia gas. The results were astonishing. The first sample punch made produced over 500,000 parts without any touching-up while in operation. When the punch finally broke due to an accident on the press, the working end showed less than 0.00015 in. wear. Later on this record was pushed to 875,000 pieces with one punch.

It appears that the nitriding process in the salt bath produces a more slippery and soapy surface beneficial for draw dies, than the gas nitriding process. This however, needs some further investigation. There does not

(CONTINUED ON PAGE 66)

Hardness and Charpy Values (Ft.-Lb.) At Tempering Temperature From 300 Deg. to 1200 Deg. F.

ADVANCE DIE & TOOL CO., CLEVELAND

Unnotched Specimens—3/8 in. dia. x 2 3/8 in. long. Hardened in atmospheric controlled Westinghouse Endogas furnace and tempered for one hour at temperature in Lindbergh air draw furnace.

BRAND	CHEMICAL ANALYSIS									Quenching Medium	Quenching Temperature, Deg. F.		TEMPERING TEMPERATURE; ROCKWELL "C"; AND CHARPY										REMARKS
	C	Mn	Cr	Va	Mo	Co	Ni	Si	W				300 Deg.	400 Deg.	500 Deg.	550 Deg.	600 Deg.	700 Deg.	800 Deg.	900 Deg.	1000 Deg.	1100 Deg.	1150 Deg.	
P. R. K.	1.40	0.30	13.00		0.60	3.00	0.50	0.60		Air	1850	RC	61	59	58½	58	57½	57	57	58½	59	52	46	
												Charpy	39.2	39.2	31.0	46.5	47.0	20.2	31.3	34.3	25.6	39.6	54.3	
Wh. Label	1.60	0.35	12.88	0.27	0.75			0.46		Air	1750	RC	63	61½	60	59	58½	58½	58¼	58	59¼	50	48	
												Charpy	16.2	29.7	33.0	22.3	22.3	24.8	21.4	31.3	24.3	39.2	32.0	
Atmodie	1.00	0.65	5.25	0.25	1.10			0.25		Air	1775	RC	63	60½	59½	59	58½	58	57½	60	59	54	50	90 deg. to direction of rolling.
												Charpy	12.9	20.2	11.9	21.4	49.1	11.9	12.9	12.4	14.0	21.4	35.9	
Airkool	0.95		5.25	0.50	1.15					Air	1800	RC	63	61	58½	58½	58	57½	57½	57				
												Charpy	24.3	40.8	71.0	64.4	82.4	71.0	65.0	66.2				
Select-B	1.00	0.70	5.25	0.25	1.10			0.30		Air	1760	RC	63½	61	60	59¼	59	58	57¾	57¼	55	52½	49	
												Charpy	33.0	29.7	37.0	33.0	29.7	30.6	33.0	33.0	47.3	68.1	47.3	
Air-Alloy	1.00	2.00	0.80		0.80					Air	1550	RC	61	58½	57½	56	55	53½	52	49				
												Charpy	31.3	34.7	33.0	35.9	30.6	47.3	76.7	92.4				
Neor	2.30	0.40	13.00				0.45	0.60		Oil	1740	RC	63	62	61	60½	60½	59	58	58	55	47		
												Charpy	16.2	24.3	12.4	11.4	20.2	18.9	20.8	22.3	16.2	20.2		
Yell. Lab.	0.90	1.15	0.50	0.15				0.35	0.50	Oil	1500	RC	62½	60½	58½	57	56	53	51	47				
												Charpy	37.0	47.0	47.5	54.3	63.4	77.6	116.5	140.3				
Ry-Alloy	0.90	1.60			0.25			0.22		Oil	1440	RC	62½	59	57	56	54½	51	48	44				
												Charpy	29.7	35.1	37.0	50.8	163.3	174.5	N.B.	N.B.				
H. T. M.	0.70	0.60	0.70		0.20		1.50			Oil	1475	RC	61	59	55	54	53	50	47	44	40	37	34	
												Charpy	118.4	126.5	133.1	100.0	143.0	N B.	N B.					
0.70 per cent C	0.65	0.60								Oil	1500	RC	61	58½	55	52½	50½	47	42½	38	34	28	25	
												Charpy	14.0	18.9	9.7	18.0	9.7	21.8	178.5	187.7	N.B.	N B.		
V. D.	1.00	0.30		0.25				0.22		S. brine	1450	RC	65	61¾	53½	57	54½	50	46	41				
												Charpy	20.2	35.9	50.8	67.0	34.3	N B.	N.B.					
Col. No. 7	0.90	0.20	0.20					0.25		S. brine	1450	RC	64	61½	57½	56	53	49	45	41				
												Charpy	15.1	24.3	77.6	81.0	N.B.	N.B.						
Drill Rod	1.00	0.25						0.30		S. brine	1450	RC	64½	61½	58½	58½	54	49	45	41				
												Charpy	23.3	30.5	33.0	61.8	128.0	N.B.						

Meeh. "A"	3.00	1.00						1.20		Oil	1590	RC	51	49½	48	47	47	43	38	35	30	25	23		
												Charpy	15.1	9.7	11.9	7.0	12.9	12.9	7.4	7.0	7.6	12.3	12.9		
Hampden	2.10	0.25	12.50				0.50	0.25		Oil	1775	RC	63	61	58½	58½	58	57½	57	56	52	46	44		
												Charpy	16.2	25.6	26.5	25.6	20.2	22.3	16.2	26.5	25.6	28.0	35.9		
Castaloy	1.55	0.55	13.00	0.40	0.85	0.70		0.55		Air	1825	RC	63	61	60	59½	59	59½	59½	60	60	49			
												Charpy	16.2	3.0	4.0	17.6	6.0	6.0	16.2	11.9	14.0	15.1			
Carp. No. 484	0.95	0.70	5.00	0.20	1.00			0.20		Air	1775	RC	63	60½	53½	53½	57½	57½	58	53½	57½	51½	48½		
												Charpy	22.3	25.6	25.6	25.6	24.3	24.3	29.7	33.0	21.4	42.0	41.0		
Atmodie	1.00	0.65	5.25	0.25	1.10			0.25		Air	1800	RC	63	61	60	60	59½	58	58	59	59½	53½	51	Cut parallel to direction of rolling	
												Charpy	17.6	18.9	22.3	31.3	28.0	24.3	28.0	24.3	25.6	24.3	40.5		
Windsor	0.98	0.35	5.25	0.25	1.00			0.40		Air	1800	RC	63½	61½	60	59	53½	58	58½	58	58½	40	47		
												Charpy	25.6	37.0	37.0	35.9	16.2	52.5	43.8	65.0	54.3	71.0	187.0		
R. D. S.	0.75	0.30	1.00				1.75	0.25		Oil	1520	RC	61	58	55	54	52½	49½	46	41	38	34	31		
												Charpy	43.8	184.0	191.2	210.8	NB								
Solar	0.50	0.40			0.50			1.00		Water	1550	RC	59	58½	55	54½	54	51	46	42	39	35	31½		
												Charpy	N.B			Shows	Less	Bend	Than	SAE	4340				
Graph-Mo	1.50	0.40			0.25			0.80		Oil	1475	RC	65	62½	61½	61	60	54	51½	47	42½	37	33		
												Charpy	11.9	14.0	11.9	12.9	14.0	24.3	39.2	52.5	63.4	100.0	120.0		
Seminole	0.40		1.30	0.25					2.00	Oil	1675	RC	56	54½	52	50½	49	48½	47	44	42	42	41		
												Charpy	26.5	34.3	52.5	61.8	61.8	90.9	100.0	153.1	195.0	125.0	103.0		
SAE X4340	0.40	0.75	0.75		0.25		1.80			Oil	1500	RC	57	54	51	50	48	46½	43½	41	38½				
												Charpy	N.B.												
SAE 4140	0.40	0.80	0.95		0.20					Oil	1550	RC	57	54	50	49	48	47	44	40	36	29	28		
												Charpy	N.B.		Same	Amou	t of	Bend	ing as	SAE	4340				
SAE 6145	0.45	0.75	0.95	0.15						Oil	1575	RC	57	55	52	50½	49	47	43	38½	34	30	29		
												Charpy	43.8	56.0	92.5	137.5	142.5	170.0	N.B.	N.B.					
Blue Label	1.00			0.17						Water	1450	RC	64	61	57½	54½	53	48½	44	38	30	23	19		
												Charpy	24.3	29.7	54.3	173.0	101.5	N.B.	N.B.						
Graph-Tung	1.50	0.40			0.50			0.65	2.80	Water	1450	RC	63	59	57½	56	54½	51	45	40	36	31	28		
												Charpy	16.2	29.5	33.0	25.6	33.0	50.8	34.3	56.0	59.5	64.4	73.0		
Graph-Sil	1.50	0.40						0.90		Water	1500	RC	59	47	54	50	49	47	44	37	30	26	21½		
												Charpy	20.2	28.0	30.6	30.6	35.5	118.4	118.4	125.0	188.0	181.0	N.B.		
Sandvik 17	1.05	0.35						0.21		Water	1450	RC	63½	61	58	56	53	49	44	39½	30	25	21		
												Charpy	21.4	42.0	N.B.	179.0	N.B.								
Sandvik 20W-IV	1.17	0.28		0.07				0.17	0.62	Water	1440	RC	65	62½	60	58	56	53	49	45	40	34	30		
												Charpy	15.1	25.6	42.0	51.3	56.0	118.4	85.0	164.0	145.0	185.5	202.0		
Sterling A. S. V.	1.00	0.25	0.15							Water	1450	RC	65	62	58½	56	54	50	45	38	30				
												Charpy	17.6	35.9	N.B.	114.0	N.B.	N.B.							

N. B. = No Break.

Resistance of Die Materials to "Pickup" or "Galling"

1 Dry Test

Made by Individual Count Until Pickup Occurred

2 Soap Water

3 Drawing Compound

Made by Lubricating After Each Stroke for First 10 Strokes and One Every 5 Strokes for 50 Strokes:

After	10	Strokes	For	100	Strokes
"	20	"	"	200	"
"	30	"	"	300	"
"	40	"	"	400	"
"	60	"	"	300	"
"	100	"	"	400	"
"	150	"	"	600	"
"	200	"	"	800	"
"	300	"	"	900	"

Specimen was then run continuously without further lubrication until pickup occurred.

Experiments performed under supervision of R. Bredenbeck during first quarter of 1943 at The Advance Die & Tool Co., Cleveland.

BRAND	CHEMICAL ANALYSIS									Hardening Temperature, Deg. F.	Quench Medium	Tempering Temperature, Deg. F.	Other Treatment	Hardness, Rockwell "C" No.	TOTAL STROKES		
	C	Mn	Cr	Va	Mo	Co	Ni	Si	W						(1)	(2)	(3)
AirKool	0.95		5.25	0.50	1.15					1800	Air	950	Cyanide Nitride	58½–59	5	998	11118
AirKool										1800	Air	300		63½–64	25	19	10663
Meeh. "A"	3.00	1.00						1.20		1590	Oil	300		45–46	13	1206	10350
Meeh. "A"												Soft			7	318	7956
Alidie	1.50		12.00		0.75	0.60				1850	St. Air	950	Cyanide Nitride	58	9	3742	8557
Alidie										1850	St. Air	350		61	2	508	6425
Neor	2.30	0.40	13.00				0.45	0.60		1740	Oil	950	Cyanide Nitride	56½–57	3	3439	8354
Neor										1740	Oil	300		61–63	7	5218	7156
SAE 1020	0.20	0.85								1625	Water	280	Carb. 116 Deep	65–67	2	1161	7219
White Label	1.60	0.35	12.88	0.27	0.75			0.46		1850	St. Air	1000	Cyanide Nitride	60¼	42	2067	6446
White Label										1850	St. Air	300		63	6	1234	66
K. W.	1.30	0.30						0.45	3.50	1550	Water	300	Chrom. Plate	66	4	2064	5920
K. W.										1550	Water	300		66	2	3	4807
Ry-Alloy	0.90	1.60			0.25			0.22		1440	Oil	300		62½	2	5430	114
V. D.	1.00	0.30		0.25				0.22		1450	Water	280		64–65	3	234	5232
V. D.										1450	Water	280	Chrom. Plate	64½–65	8	927	3774
V. D.										1450	Water	450		61	1	4	109
Graph-Mo	1.50	0.40			0.25			0.80		1525	Oil	280		63–63½	6	360	4944
Windsor	0.98	0.35	5.25	0.25	1.00					1800	Air	300					

V. D.										1450	Water	450		61	1	4	109
Graph-Mo	1.50	0.40			0.25			0.80		1525	Oil	280		63–63½	6	360	4944
Windsor	0.98	0.35	5.25	0.25	1.00					1800	Air	300		63	7	593	4868
Windsor										1800	Air	950	Cyanide Nitride	57	4	755	2728
P. R. K.	1.40	0.30	13.00		0.60	3.00	0.50	0.60		1850	St. Air	300		61½	2	4816	420
P. R. K.										1850	St. Air	980	Cyanide Nitride	62	33	1372	416
P. R. K.										1850	St. Air	980	Ammonia Nitride	62	9	545	66
Blue Label	1.00			0.17						1450	Water	300		63–65	6	825	4708
AISI 4023	0.23	1.15			0.15			0.25		1500	Oil	280	Carb. 116 Deep	62–64	2	17	4460
K. R.										1475	Water	300		65	2	22	373
0.70 per cent C	0.65	0.60								1600	Oil	1000		35–36	2	547	3679
0.70 per cent C										1600	Oil	300		55	3	40	3156
Castaloy	1.55	0.55	13.00	0.40	0.85	0.70		0.55		1850	St. Air	980	Cyanide Nitride	59	8	3590	510
Castaloy										1850	St. Air	350		61–63	2	436	23337
Castaloy										1850	St. Air	980	Ammonia Nitride	60	3	1211	510
20W-IV	1.17	0.28		0.07				0.17	0.62	1440	Water	300		65½	2	2608	1586
Graph-Sil	1.50	0.40						0.90		1550	Water	280		62	2	19	1975
No. 484	0.95	0.70	5.00	0.20	1.00			0.20		1775	Air	300		63–63½	3	101	1889
No. 484										1775	Air	950	Cyanide Nitride	58–59½	2	75	1559
Vairloy										1575	St. Air	950	Cyanide Nitride	47–49	2	1648	216
Vairloy										1575	St. Air	300		61½	4	1283	192
Airloy	1.00	2.00	0.80		0.80					1550	Air	300		62	4	1177	13
Atmodie	1.00	0.65	5.25	0.25	1.10			0.25		1775	Air	950	Cyanide Nitride	58	2	513	427
Atmodie										1775	Air	300		63	2	445	211
Graph-Tung	1.50	0.40			0.50			0.65	2.80	1475	Water	280		64–65	3	316	308
Speed-Star-Mo	0.80		4.00	1.50	4.25				5.50	2200	Oil	1025	Cyanide Nitride	65	2	120	197
Speed-Star-Mo										2200	Oil	1025		65	2	8	40
Graph-M. N. S.	1.50	1.25	0.50		0.50		1.75	1.00		1650	Air	280		61–62	3	13	56

seem to be much difference in surface-hardness obtained by both processes. Since the superhard case here is very shallow, it is extremely difficult to check the hardness. According to laboratory tests conducted by others, the 940 deg. F. nitriding temperature produces a case of about 1150 vickers hardness number. It has also been found advisable to completely finish the parts before nitriding, since there is practically no dimensional change during the process. Any very thin film or coating which deposits on the parts should not be polished off, for any finishing after nitriding seems to impair the ability of the tool to resist pick-up.

During the process of development of the steel cartridge case punches, an extensive experiment was conducted to determine definitely the resistance to pick-up or galling in the various steels and with the different treatments. Here again the previously mentioned steel in the 5 per cent chromium, 1 per cent molybdenum group headed the list of 26 materials tested, both in the as-hardened state with a very low tempering cycle of 300 deg. F., and nitrided, as explained before. This upset completely the previous long-standing belief of the die maker, that plain-carbon, water-hardening tool steel was the best material for draw-dies.

Second place was taken by a high-tensile cast iron hardened to approximately 53 R_c and ground after hardening. One interesting discovery was made. A piece of SAE 1020 steel, carburized and water-quenched, came out of the race in fifth place among all the high-grade tool steels tested. The first water-hardening tool steel of the plain-carbon type appeared in ninth place.

It was interesting to note that steels which are supposed to have identical chemical analysis, but are manufactured by different steel companies, showed wide variations in performance. This observation also resulted from experiments for determining shock resistance.

Friction tests were made with different compounds, and it was found that some steels have a rather remarkable resistance to pick-up when lubricated with one kind of drawing compound but show up rather poorly in combination with some other compound. Other steels again would just act in an opposite manner. For example, a piece of material belonging to the manganese, oil-hardening group, which has always been considered a poor material for draw-dies, showed remarkable performance when lubricated with plain "Murphy's Oil Soap Water," the lubricant used on most parts made of Armco Iron for subsequent enameling. The same steel made no showing at all when lubricated with a good drawing compound or in the dry test.

Last but not least, the tungsten-cemented-carbides used with great success, should not be forgotten. It was only possible with the help of carbide die inserts to obtain a mass production on the steel cartridge case. The first dies were made out of tool steels, and perhaps the best performance was turned in by nitrided, air-hardening steel dies. But the case had to be copper-plated and various other expensive methods had to be used to keep the dies from scratching and galling under the excessive pressure set up by reducing the steel side walls. This was not necessary after tungsten-cemented-carbides were tried and found far superior to any other existing material. Better lubricants also were found, but it appears that the surface condition of a cast material, or pressed, as is the case with the carbides, lends itself better for the action present during the drawing of steel, than a forged or rolled steel does. The carbide draw-die has, therefore, definitely established itself as the leading tool material for drawing sheet metal, especially where reduction in wall thickness is required. The amount of production, of course, has to warrant the rather excessive cost. Also, this material must be made more readily available before it can be put to a more extensive use.

All these developments will play an important part in the tremendous die and tool program which promises to follow this war. They will help to make dies last longer and run without touch-up for longer periods. The result will be a cheapening of production which in turn will supply the civilian population with more of the things with which to make life more enjoyable.

Base-Metal Factors in the Phosphate Process

ONE of a series of papers in a recent issue of the German magazine *Korrosion und Metallschutz* on the phosphate process for the protection of iron and steel against corrosion, by L. Schuster, deals with the effect of the composition, state of surface and pretreatment of these metals on the formation of the protective phosphate coat.

As in the phosphating of single iron crystals no crystallographic orientation of the phosphate layer to the matrix or to the surface on which it is deposited is observed, it is also probable that, with multi-crystalline matrices, the protective coats possess no preferred orientation or any orientation whatever. In consequence, the formation of these phosphate layers depends on a variety of factors which may influence the boundary layer. The diminution in iron content in the layer from the interior outwards, when this layer is produced in a manganese or zinc phosphate bath, indicates that at the start iron phosphate is formed, the cathode being furnished by the metallic surface itself. On this iron-phosphate base the true phosphate layer can then be built up, the iron being replaced by manganese and zinc as the thickness of the layer increases. The building up of this layer is determined by the velocity of nuclear formation and the velocity of crystal growth of the various metallic phosphates. The principal factors influencing these two velocities are:

(*a*) *Composition of the Iron*—Previous experiments have shown that in the long-immersion process the phosphate layer becomes more coarsely crystalline as the pearlite content increases. This may be explained by the low solubility of the pearlite in phosphoric acid, that is, by a lower velocity of nuclear formation at the pearlite boundaries. In the short-immersion processes, the effect of varying pearlite concentrations can no longer be reduced to a law, and it appears that, when using accelerators, the effect of the pearlite boundary on the velocity of nuclear formation is not measurable. Alloy steels show the

(*Continued on Page* 175)

Roll Gun Welders

Fabricate Steel Jettison Tanks

. . . Difficulties in resistance welding jobs can often be traced to inadequate preliminary production planning and cost analysis, improper tooling or failure to control welding processes. Here is a step-by-step description of the planning required for economical tooling up for resistance welding of gasoline tanks, and a detailed description of the special portable roll welding guns and fixtures.

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DESIGN of the 150 gal. auxiliary jettison gasoline tank for North American Aviation's P-51 was arrived at by Preco, Inc. (formerly Pacific Railway Equipment Co.) after full consideration of operational requirements and production factors. Only a set of general specifications and an outline of the tank were furnished Preco. The tank, to be made of mild steel and weigh a maximum of 92 lb., must pass a vibration test. Its fabrication was a matter of choice. Resistance welding was chosen as the best means of assembling the components of the tank, the main elements of which may be seen in Figs. 1 and 2.

The tank is composed of two half-shells, each having a number of skin stiffeners and five bulkheads fastened to it. Half-shells are assembled to one another and overlapping edges of the bulkheads are spot welded. A support structure composed of arc welded tubes and channels is dropped over the two front bulkheads and spot welded to them. Two top pans form the top cover of the tank. All external seams are tack spot welded, and then seam welded by torch. These main assembly steps are listed in Table I. Made entirely of cold rolled mild steel, the tank shell, skin stiffeners, bulkheads and top pans are 0.024 in. thick, and the support structure channels 0.060 in. thick.

Available Equipment

With the evolution of the tank design, the final spot welding analysis was made. This too is summarized in Table I. The production schedule called for 15 tanks per day. It was required that tank production be started in a few months which precluded the purchase of additional resistance welding equipment. The company had on hand resistance welding equipment that had been used in the fabrication of three railroad cars, and a portable seam welder had been developed so it was reasonable to design a tank with external seams to make use of this equipment.

The first question to be decided concerned the possibility of producing the required number of tanks per day with the equipment available. Five welding units were on hand. It was necessary to do six different welding operations. One of the five welding units was a stationary welder used on subassemblies not mentioned in this article. The portable seam welder was attached to another unit. This left three welding units available for five separate welding operations. Each of these units had a portable spot welding gun which could be replaced if necessary. Each welding unit was composed of an a.c. transformer, electronic timer, sequence and heat control panel, ignitron tube contactors and hydraulic booster.

The data listed in Table II, show that with conventional spot welding equipment it would have been impossible to spot weld stiffeners and bulkheads to the tank skins fast enough to maintain the required tank production rate. Locating the bulkheads on the tank half-shells and holding this assembly in a conventional spot welder would have been very awkward, especially since it was important for assembly reasons to maintain extreme accuracy of the bulkheads on the skin sheets. The skin sheets have double curvature and the bulkhead flanges were not at 90 deg. with respect to the plane of the bulkhead, thus each spot weld would be difficult to make and to assure minimum indentation on the skin sheet. That is the reason for the low welding rate indicated for this operation in Table II.

The same reasoning held true for the operation of fastening skin stiffeners onto the skin sheets. There are 22 stiffeners for each half-shell, and each has a different contour. Positioning these on a skin shell and holding them in proper location while welding in a conventional spot welder would be difficult and costly.

After a tooling study and some preliminary time and cost analyses, it was decided that special guns and fixtures would reduce the cost of these resistance welding operations and assure the required production with available welding units. The guns were to be utilized with two of the three welding units. It is interesting to note that the time and cost estimates summarized in Table II were borne out very closely in production.

Fortunately it was only necessary to remove the existing portable spot welding guns and secondary leads in order to adapt the welding units to the special roll welding guns and fixtures.

Thus there was only one unit left to handle the three remaining welding operations. This was made possible by connecting two sets of portable spot welding guns and secondary leads to the transformer. One of the guns had to have a 48 in. reach and the other a 6 in. reach. By carefully estimating the welding time of each of the three operations it was found that this scheme was feasible. Naturally only one gun could be used at a time, but even so this one unit could handle these three welding operations on the required number of

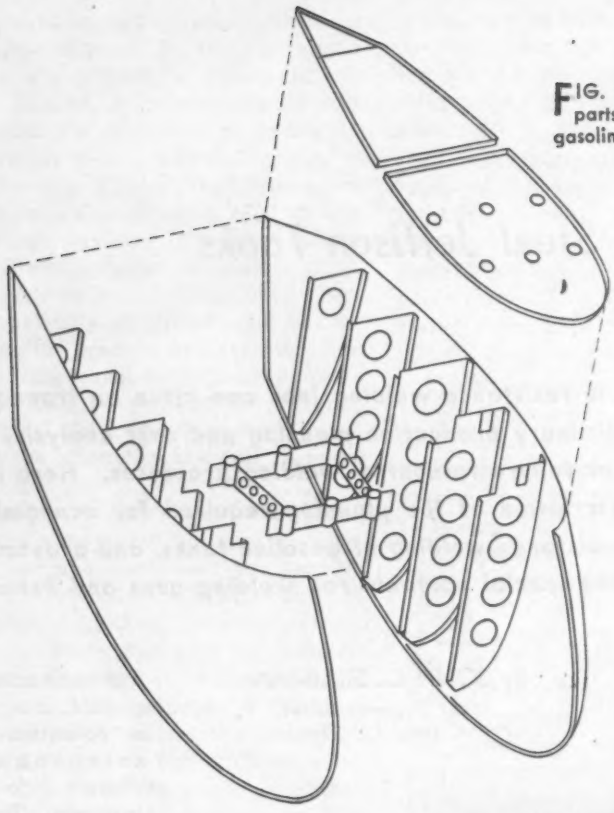

FIG. 1 — Component parts of airplane gasoline jettison tanks.

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FIG. 2—Welded steel 150 gal. jettison tank. A portable seam welder is being used to attach top pan after assembly of half-shells by seam welding.

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tanks per day. The extreme importance of the job resistance welding analysis can therefore be appreciated.

Skin Stiffener Fixtures

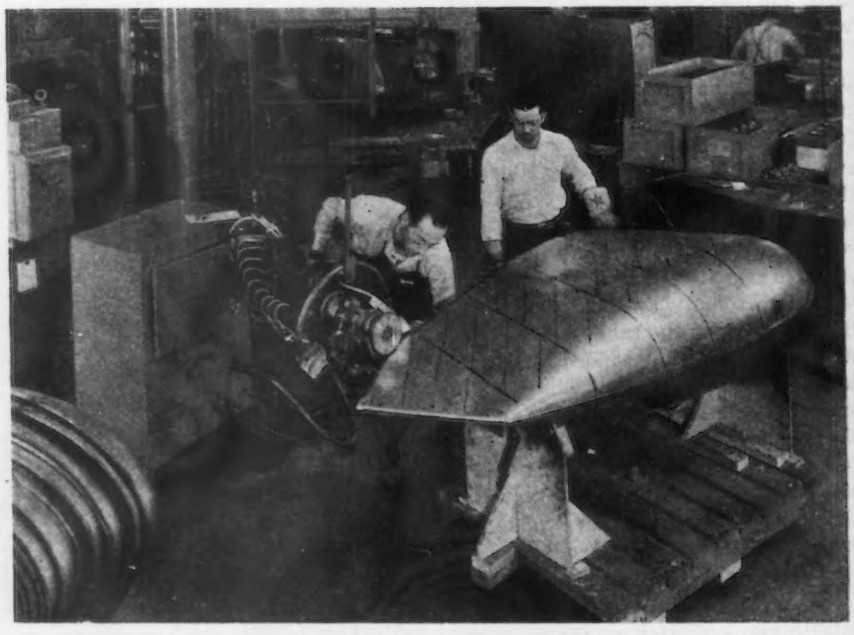
For many years the automotive industry has used special resistance welding fixtures in which a copper grid system is used to back up the sheets to be welded. A series of welding electrodes fires in sequence to weld the assembly into a unit. As total production of jettison tanks was to be only 5000 units it is obvious that this type of tooling would be uneconomical. It was clear that some type of copper backup system must be employed, but that a simpler type of welding gun must be developed. A hydraulically actuated expansion type roll welder, Fig. 3, served the purpose. It is described in detail later on.

Because of the size and configuration of the skin sheets it was decided to lay them horizontally on copper backup sheets supported in concrete as shown in Fig. 4. Before tooling, a master tank in halves was made from mahogany with the outside surface conforming to the mold line surface of the production tank. In order to pour the concrete, the master mahogany tank-half was laid on the floor with the contour surface facing upward and a wood form was built around it. The copper backup sheet, already formed to fit the outside surface of the master wood tank-half, was laid over the master and anchored with wire. Steel studs were tapped into the copper sheet and interlaced with light reinforcing steel to bond the sheet to the concrete which was poured over it and leveled off on top. Several pipes were laid in the concrete to be used in lifting it off the mahogany tank after it had set. The form was mounted on a base made up of structural channels and pipe supports anchored to the floor.

It was essential to build an overhead structure against which the welding gun could obtain reacting pressure. The structure required a set of tracks against which the two upper wheels of the gun could bear while welding any of the 22 stiffeners to each tank half-shell. Fig. 4 illustrates the general layout of this overhead system. Composed of a truss network made out of pipe arc welded together, it was a torsionally rigid structure.

A gantry containing tracks of three different contours was also fabricated mainly from pipe and plate as shown in Fig. 5. At its four corners the gantry was provided with ball bearings to ride on the fore and aft main lower truss members of the overhead structure shown in Fig. 4. Indexing between stiffener locations was by detent holes drilled in appropriate positions in the lower chord of the front truss member and a spring loaded ball in a tube attached to the gantry. When hydraulic pressure is applied on the welding gun, a hydraulic clamp is also actuated which prevents the gantry from moving laterally.

A stiffener holding jig was made from a tank shell by cutting slots in it at the stiffener locations and screwing steel and masonite strips on either side of the slot. A gap of 1/32 in. was left between each steel strip and masonite and spring loaded balls



were inserted in the masonite. Thus when outstanding flange of the skin stiffener was pushed up between the steel and masonite, the spring loaded balls held the flange in place. This holding jig was positioned over each tank shell by indexing pins. The stiffeners were tack welded in place by the gun and then the holding fixture was removed. Then the stiffeners were welded to the skins.

Power Pack

The welding apparatus necessary for the operation of the fixture was built up as a unit called a power pack and identified in Table I as welding unit No. 1. Essentially, it is an electronically controlled a.c. welder suitable for mild steel. It comprises the electronic timer and sequence panels, ignitron contactor tubes panel, hydraulic booster, a 200 kva. transformer, heat control unit and the necessary air and water lines. A slight overhead boom served to balance the weight of the secondary welding cable, water and hydraulic lines and the gun itself.

The area of the large secondary welding loop varied greatly as the gun was moved from position to position when welding stiffeners to the skin sheets. This variation in area changed the impedance of the loop and therefore the current passing from the gun to the copper backup sheet, resulting in welds of varying size.

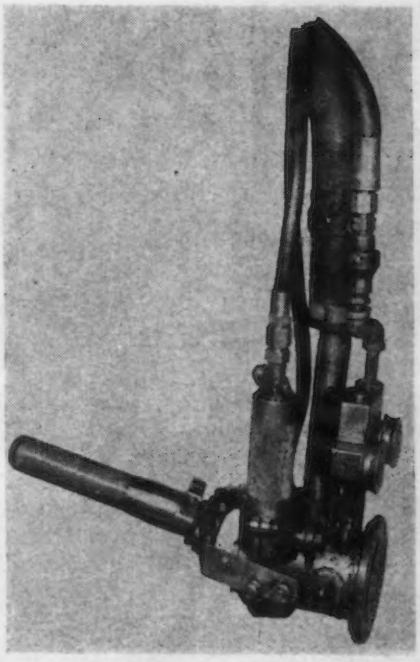


FIG. 3—Portable roll gun welder developed for welding steel skin stiffeners and bulkheads to tank half-shells.

To reduce variation in the welds, the impedance of the welding loop was deliberately increased by bolting heavy 1 in. mild steel plates to the secondary buss bars near the transformer. Adding iron in the welding circuit greatly increases the inductance and therefore the impedance of the circuit. The variation of the impedance in the welding process therefore was relatively small when compared with the total impedance. This necessarily made greater demands on the welding transformer but the 200 kva. capacity was ample. The variations in the welds were reduced to acceptable limits.

The outlet of the water cooling system was so arranged that the rate of flow could be checked individually for the ignitron tubes, transformer, and the secondary cable and gun lines. Regulating valves were placed in each line to adjust the water flow. Each outlet emptied into a small receptable and drain line. Excess heating in the secondary welding cable caused steam to emit from the drain line which would be noticed immediately.

The use of the power pack has been of great benefit to the production setup. As many as three special welding fixtures have been built around one power pack, although only

TABLE I

Spot Welding Cost Analysis

Welding Condition	Welding Unit	Mild Steel Gages	No. of Welds	Weld Spacing	Man Min. Per Unit	Welds Per Man Minute Average Rate	Cost Per Weld	Cost Per Weld Including Tooling
Spot weld stiffeners to skins. 22 stiffeners on each side of tank.	No. 1	0.024 in. to 0.024 in.	580 welds per side; total, 1160	½ in. center to center	35 min. per half-shell. (1 man)	16.6 welds (Max. machine welding rate is 110 welds per min.)	0.3c.	0.44c.
Spot weld bulkheads to skins and drill skin flange indexing holes.	No. 2	0.024 in. to 0.024 in.	325 welds per side; total, 650	½ in. center to center	15 man min. per half-shell (1 man)	21.7 welds (Max. machine welding rate is 120 welds per min.)	0.23c.	0.49c.
Tack weld left and right half tank shells together.	No. 3 6 in. portable gun	0.024 in. to 0.024 in.	160 welds per tank	2 in. center to center	12 man min. per tank (1 man)	13.5 welds (Max. machine welding rate is 90 welds per min.)	0.37c.	0.37c.
Spot weld left and right bulkheads together.	No. 3 48 in. portable gun	0.024 in. to 0.024 in.	180 welds per tank	¾ in. center to center	8 man min. per tank (1 man)	22.5 welds (Max. welding rate is 90 welds per min.)	0.22c.	0.22c.
Spot weld support structure to bulkheads.	No. 3 6 in. portable gun	0.024 in. to 0.060 in.	180 welds per tank	½ in. center to center	9 man min. per tank (1 man)	20 welds (Max. welding rate is 90 welds per min.)	0.25c.	0.25c.
Seam weld shell and seam weld top pans to shell.	No. 4 portable seam welder	0.024 in. to 0.024 in.	340 in. of seam weld per tank	Lineal speed of seam welding wheel is 30 in. per min.	50 man min. total per tank (2 men)	Seam welding rate is 6.8 in. per min.	0.74c. per in.	0.74c. per in.

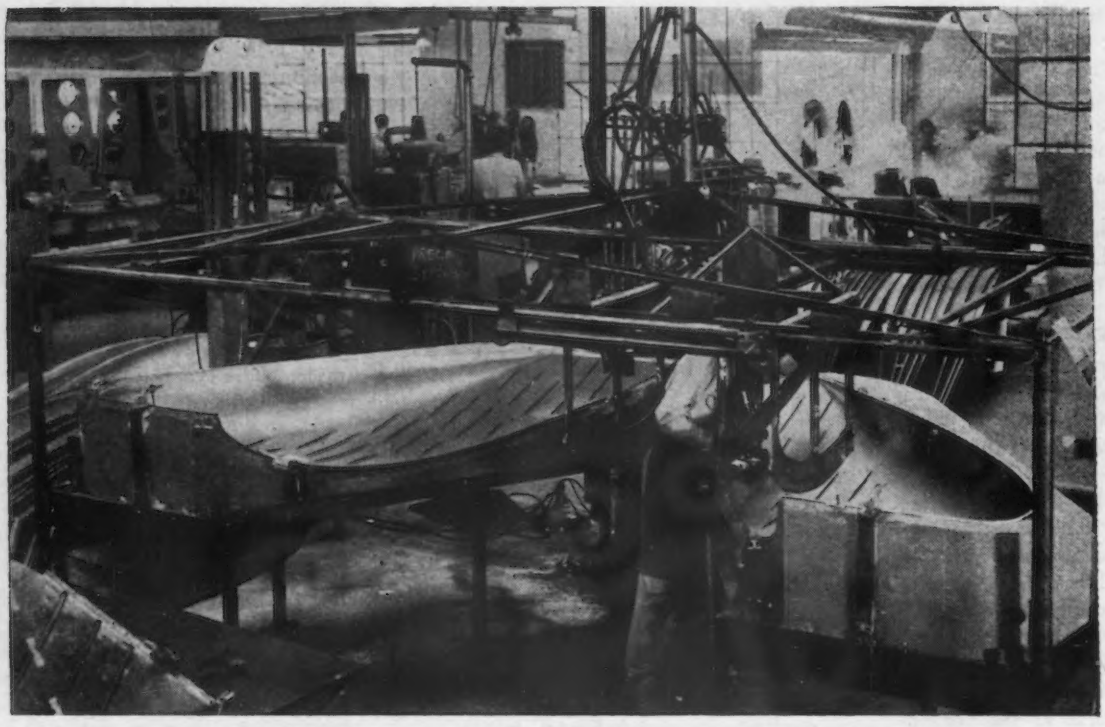


FIG. 4—Tank half-shells resting in concrete forms while skin stiffeners are applied by portable roll welding gun. Pipe structure anchored to floor and tracks mounted on gantry suspended from it permit application of hydraulic pressure to the roll.

one fixture can be used at a time. In one case, secondary busses 12 ft. long have been fed from the power pack to a special fixture welder.

Bulkhead Fixtures

The same general principles were applied in developing the fixture used to weld tank bulkheads to the skin shells. Main features of the setup are illustrated in Figs. 6, 7 and 8. Since the same type of portable welding gun and fixture was used for the bulkheads as for the stiffeners, only the special features peculiar to the bulkhead welder need be explained.

After considering various arrangements, it was finally decided to mount the skin shells back-to-back in a vertical position as shown in Fig. 6. This arrangement permits a compact and rigid copper backup system and gives the welder the greatest accessibility possible.

The fact that the minimum spacing between bulkheads was only 11 in. dictated the size of portable welder required. Holding fixtures for the bulkheads were designed to be rotated into a horizontal position for ease in securing the bulkheads to them. They may be seen in Fig. 8. These fixtures contain tracks against which the roll welding gun travels. The gate which holds the bulkhead in the fixture and the tracks for the welding gun are seen in Figs. 6 and 8.

For rigidity the principal members of the skin shell holding fixtures were made from 3/16 in. mild steel plate. Two side plates were cut out to the outside contour of the skin shells. On these were mounted Danly clamps to hold the skin shells' outside flanges. The clamps also served as drill jigs to locate indexing holes in the skin sheets. These two side plates were tied together by a series of transverse 3/16 in. mild steel plates, one behind each copper backup bar, and a top horizontal mild steel plate. This created a rigid box structure. The whole unit was supported by vertical pipe pedestals and cross bracing of pipe and bars. Fig. 6 shows the convenience of mounting the transformer in a central location above the fixture.

The welding gun was suspended by a flexible steel cable attached to a Thor balancer hung from a small ball bearing truck on a track. This arrangement made it easy for the

TABLE II

Spot Weld Tooling Analysis

Welding Stiffeners to Skin Sheets, based on 5000 tanks, a total of 5,800,000, welds. Welding rates are average rates per shift.

Welding Equipment	Tooling Cost	Production Welding Rate Per Min.	Total Time Min.	Tooling Cost Per Spot Weld	Production Cost Per Per Weld	Total Cost Per Spot Weld
Conventional stationary spot welder	$1000	10 welds (2 men)	116	0.017c.	1c.	1.02c.
Special roll welding gun and jig	$8000	16.6 welds (1 man)	70	0.14c.	0.3c.	0.44c.

Welding Bulkheads to Skin Sheets, based on 5000 tanks, a total of 3,250,000 welds. Welding rates are average rates per shift.

Welding Equipment	Tooling Cost	Production Welding Rate Per Min.	Total Time Min.	Tooling Cost Per Spot Weld	Production Cost Per Per Weld	Total Cost Per Spot Weld
Conventional stationary spot welder	$1000	8.5 welds (2 men)	76	0.031c.	1.18c.	1.20c.
Special roll welding gun and jig	$8500	21.7 welds (1 man)	30	0.26c.	0.23c.	0.49c.

welder to move the gun from bulkhead to bulkhead and from one side of the fixture to the other. Every effort was made to have no structure or other incumbrance in the way of the operator.

Positioning Backup Bars

One of the main problems in the construction of this fixture was to form and place the copper backup bars into the exact position to fit the external contours of the left and right skin shells. The problem was further complicated by the double curvature of the skin shells. A scheme was used which can be generally applied to any welding fixture where copper bars must be accurately set with respect to the sheets to be welded together.

A cross-sectional view of the arrangement from above the fixture is shown in Fig. 10. Each copper bar was cut and then formed approximately to the required contour by using the master left and right mahogany tank-halves as templates. The 3/16 in. steel plates were set in the welding fixture after having been cut roughly to the proper contour. Cap strips, 3/16 in. thick, were welded to them, and these were formed to approximately the right contour, allowing a space of ¼ in. between them and where the copper bars should be located.

Each copper bar was set in place in the fixture and screwed to the mild steel cap strips with 5/16 in. flat head steel screws. In addition at 6 in. intervals, staggered between the screws, ⅜ in. steel machine bolts were screwed into the back side of the cap strips and provided with lock nuts. Both fasteners ran down both sides of the cap strip, and by adjusting bolts and screws, it was possible to move portions of the copper bars in and out and to change the lateral twist in the bars.

Each half of the mahogany tank was mounted on a dolly and rolled into the position that the skin shell would normally occupy. The space between each copper bar and the wood master tank shell was measured at all points along each bar by using shim stock. The wood master tank was then removed, and the bar positions were adjusted by use of the screws and bolts. After several cut and try setups, the bars were set so that they conformed very accurately to the master wood tank-halves.

The space between each copper bar and its steel cap strip, shown as ¼ in. in Fig. 10, was dammed in by using clay. Molten Cerrobend was then poured into this space and al-

RIGHT

FIG. 5—Close up of roll gun welding of skin stiffeners to tank half-shell. Note gantry track against which gun operates.

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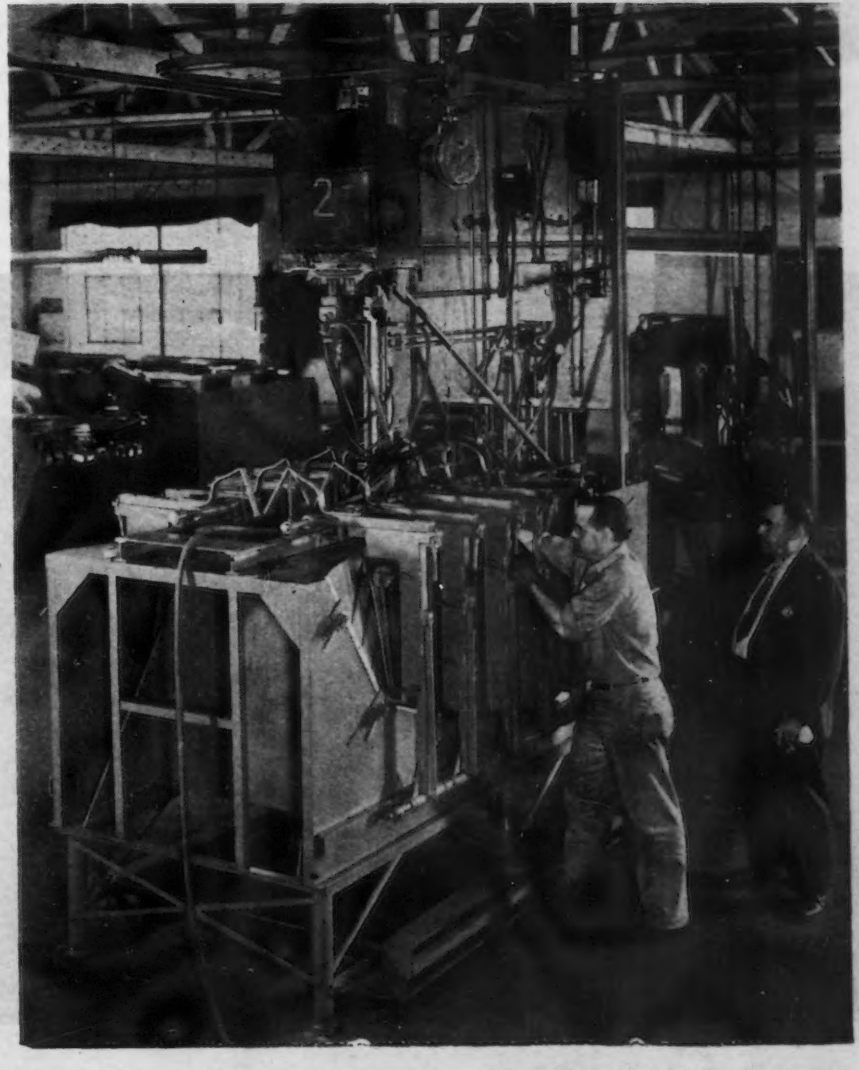
BELOW

FIG. 6—Fixture for roll gun welding of bulkheads to steel tank half-shell. Capacity of fixture is two half-shells which permits loading of one side while the operator is welding the other. Firing of gun is by foot treadle, but a simple cam operated cover prevents accidental firing from the side opposite the welder



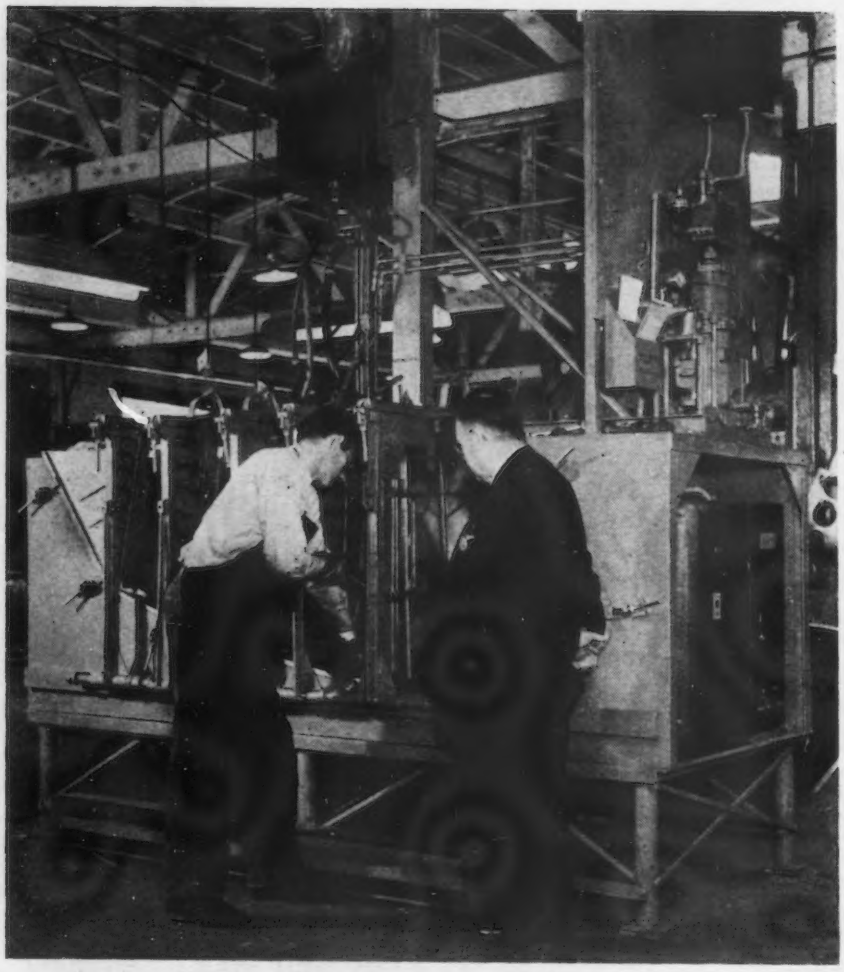


FIG. 7—Bulkhead welding fixture showing at right electronic timer and sequence panels, ignitron contactor tubes panel, hydraulic booster, transformer, heat control unit, and air and water lines.

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lowed to cool. Cerrobend melts at a temperature below 212 deg. F. and has practically no contraction upon cooling. Each copper bar was located in its proper place and given a solid and rigid backing by this method.

This same method was employed for locating bulkhead locking fixtures on the welding fixture. Fig. 6 shows that each bulkhead holding fixture rotates about a lower pivot point, and when in position is supported along its top edge by a square tube extending out from and welded to a piece of pipe. The pipe rotates on a longitudinal steel rod running along the top of the welding fixture. Generous clearance was provided between these pipes and the steel rods on which they rotate. After the copper backup bars were set in place, the skin shell was clamped in position and the loaded bulkhead fixtures were clamped into position with respect to the skin shell. The lateral location of the bulkheads was determined by establishing base lines and station lines in the welding fixeure top plate and a level was used to aline the bulkheads vertically.

Molten Cerrobend was poured into the space between the pipes and steel rods. By using a riveting hammer on the steel pipes after solidification of the Cerrobend, the bearings loosened enough so that each bulkhead fixture could rotate freely. This saved many manhours in the construction of the jig, as it made it unnecessary to locate the upper and

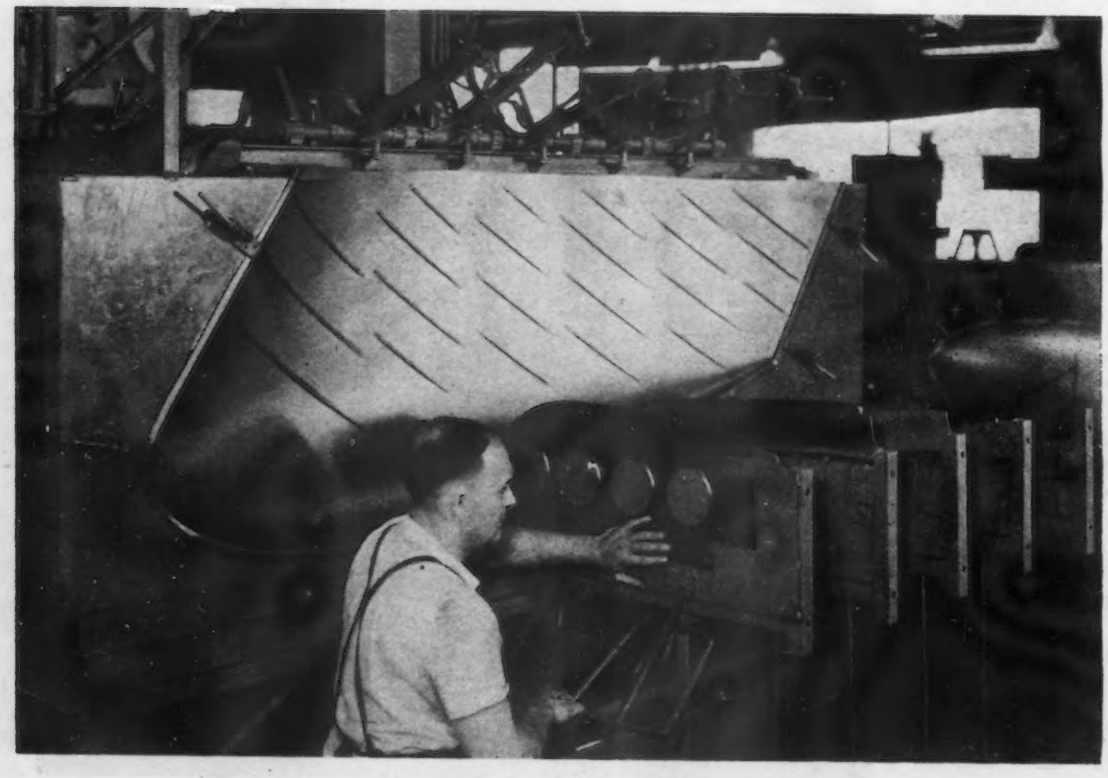

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FIG. 8 — Loading bulkheads on pivoted fixtures in the folded down position. Note half-shell fastened to welding fixture by Danly clamps.

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lower rotating rods with extreme accuracy.

Lateral copper bars were connected to the top and bottom ends of the bulkhead copper bars to help reduce the variations in the welding loop at different locations. On each side of the buss bar steel bars were clamped which connected one of the transformer secondary leads to the copper buss bar backup network. This increased the impedance of the secondary welding loop, so that the variations in the loop area had a reduced effect in changing the welding current. The bars were water cooled.

Because of the location of the secondary flexible lead from the transformer to the welding gun (Fig. 6) and the fact that the other lead was adjoined to the copper backup system, some of the steel structure of the welding fixture is in the welding loop. During production welding these steel elements heated to such an extent that some of the Cerrobend flowed around the space between the rod, and in some cases steel pipes on the top plate of the welding fixture melted. To overcome this, cooling tubes were affixed to these steel pieces.

In some preliminary welding tests using a loop area of about the same size as that of this fixture, the secondary current was estimated to be 7500 amp. With a 30 per cent duty cycle it was decided to use copper busses of 1 sq. in. cross-section. The buss leading from the transformer to the copper grill system was twice this heavy. The nearest commercial size of buss was ⅜ in. by 3 in. hard drawn copper bar, which gives a current density of 1500 amp. per sq. in. The bars heated to some extent but never enough to melt the Cerrobend. A 400,000 cm. flexible welding cable was used to connect the gun with the transfomer. This was water-cooled.

Portable Roll Gun Welder

The portable welding gun had to be extremely compact because the bulkhead minimum spacing was 11 in. and several of the bulkheads were 11½ in. deep. It had to be light enough so that a man could handle it all day without becoming unduly fatigued. External water cooling on the wheel seemed impractical. It had to have a compact and powerful drive with a simple speed adjustment. The gun is shown in Figs. 2 and 5.

The housing of the gun was made from a 2¾ in. dia. Mallory 3 bar, approximately 2 9/16 in. long, which was bored out to receive a ½ in. stainless steel shaft and flange to which was fastened a Mallory 3 copper alloy disk. A rim 4½ in. in dia. by ⅜ in. thick was bolted to the disk to serve as the welding wheel. The disk made contact with the end of the gun housing through which the current was lead from the flexible secondary cable. To prevent arcing, pressure between disk and gun housing was established by a Belleview spring washer bolted on the back end of the shaft. The contact area between disk and gun housing was approximately 4.95 sq. in. A ¼ in. copper cooling tube soldered into a milled groove on the housing cooled the welding wheel as well as the housing.

A small Buckeye air motor was used to power the wheel. Governed by a needle valve it was mounted vertically at the back of the gun housing, and power was applied by a worm and gear affording a speed reduction of 60:1.

Welding gun pressure was developed hydraulically because of space and weight limitations. An air-hydraulic booster installed in the power pack developed 1400 lb. per sq. in. hydraulic pressure from 100 lb. per sq. in. air pressure. Two ½ in. Everdur bronze fixed pistons were pressed into the top of the gun housing, through Micarta insulating sleeves and the floating cylinders were bored in a stainless steel housing which supported the wheels that ran on the welding track. These wheels were mounted on needle bearings and some lateral play was permitted to allow for inaccuracies in the gun backup track. The hydraulic hose was connected to the upper housing through a Chicksan swivel fitting. Thus when pressure is developed, the upper housing moves with respect to the lower gun housing. Maximum wheel pressure of about 550 lb. can be exerted..

By installing a good grade of Norgren hose fittings and using neoprene hose throughout, maintenance work on the water and air hoses was practically eliminated and replacements could be made quickly.

The contact surface of the gun housing must be polished from time to time as some pitting develops after several days of welding. A Zerk fitting in the housing permits this surface to be greased at least twice during each shift.

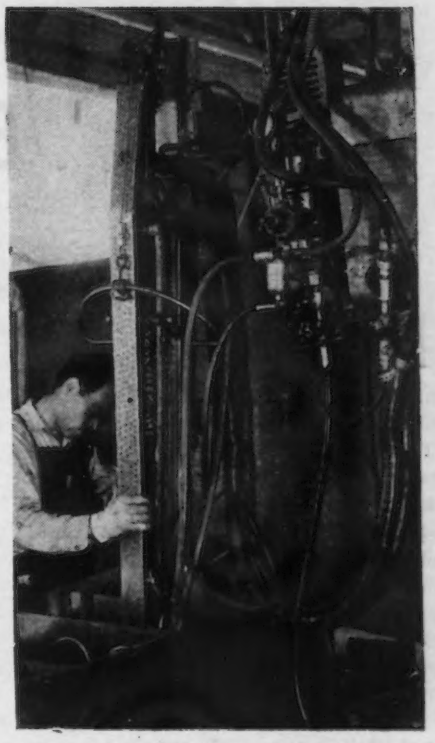
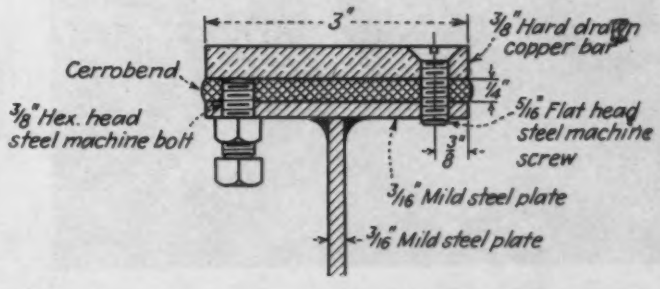


FIG. 9—Spot welding left and right bulkheads together with 48 in. portable spot welder.

To assure uniform quality of welding it was essential to observe the following precautions: (1) A small gage was provided for the operators to check the welding wheel contour every several hours. Variations in the wheel contour affect the size of spot welds being made. The operators use emery cloth for light wheel dressings but wheels are redressed in the machine shop periodically. (2) Hydraulic pressure is checked and rings in the gun pistons replaced when necessary. (3) The wheel speed of 5 r.p.m. is checked as it affects the welds. (4) The "On" and "Off" welding intervals are checked with a cycle recorder. An "O" time of 15 cycles (60 cycle system) and "Off" time of 30 cycles gave acceptable welds. (5) Heat control readings are never changed unless approved by the welding lead man. Sample skin sheets were welded to bulkheads and the parts torn apart to examine the size of weld plugs.

FIG. 10 — Section through plan of copper back-up bar and plate connection in bulkhead fixture.



. . . Extending Cutting Tool Life

IN recent months, the refrigeration treatment and salt bath nitriding of high speed steel cutting tools has been given much attention both in print and in actual production tests. This article, however, will not attempt to elaborate on any previous work but will deal with production application of the refrigeration treatment and nitriding to purchased multipoint H.S.S. cutting tools. Most of the recorded results were obtained through investigations of erratic tool performance on actual production setups.

These investigations showed, in general, that many purchased tools were of substandard quality, because of one or a combination of the following: low hardness (below 63 Rockwell C), improper carbide segregation and improper grinding. A low hardness, if caused by austenite retention, can in most cases be increased to an acceptable degree by refrigeration treatment. Improper carbide segregation is a direct result of mill practice and cannot be completely eliminated once the tool is finished ground to blueprint specifications. Improperly ground tools, that is, "burned," can be improved by regrinding to remove the burned areas if blueprint dimensions permit the removal of the stock. In addition, an excessively rough finish will tend to decrease tool life and can be corrected by regrinding or honing.

Refrigeration is applicable only to tools which have been originally improperly heat treated, resulting in austenite retention which in most cases originates from lack of adequate tempering. In refrigeration a structural change takes place, in that the retained austenite is transformed into martensite with a corresponding increase in hardness. There are several methods of refrigeration which may be used. Mechanical, dry ice and Varsol, dry ice and alcohol, etc. Whichever method is used, the necessary temperature of the refrigerant appears to be an approximate maximum of —65 deg. F. Time at temperature is apparently not critical but ½ hr. seems to be a safe minimum. Example of the increase in hardness of several end mill cutters refrigerated at temperatures of —80 to 100 deg. F. are as follows: The following hardness readings are taken on the Rockwell C scale as near the cutting edge as possible.

As Received	After Refrigeration
56	65
56	65
58	64
60	66
63	65

To give a more conclusive indication of what refrigeration will do in some cases, a ⅜ x 24 tap which showed an "as-received" (quenched and tempered) hardness of 59-60 R_c, as converted from microhardness values at the cutting edge, was refrigerated at approximately —100 deg. F. for 2½ hr. total time and followed by tempering at 1050 deg. F. for 2 hr. The hardness increased to 65/66 R_c, as converted from microhardness check. Before refrigeration, the production yield from such a tap was eight to ten holes per tap while tapping AMS 6250 at 40 R_c. After refrigeration and tempering the tap yielded 616 holes before complete failure occurred. This tap would have probably tapped more holes if it had not been overloaded by the operator.

At this point it is necessary to emphasize the necessity of a tempering operation after refrigeration to relieve the internal stresses in the newly formed martensite. It is recommended that the tools be tempered in a salt bath to prevent detrimental oxidation. If a tool is to be nitrided after refrigeration, it is not considered necessary to temper since the nitriding temperature, even though of shorter duration (20-30 min.) is a tempering operation in itself.

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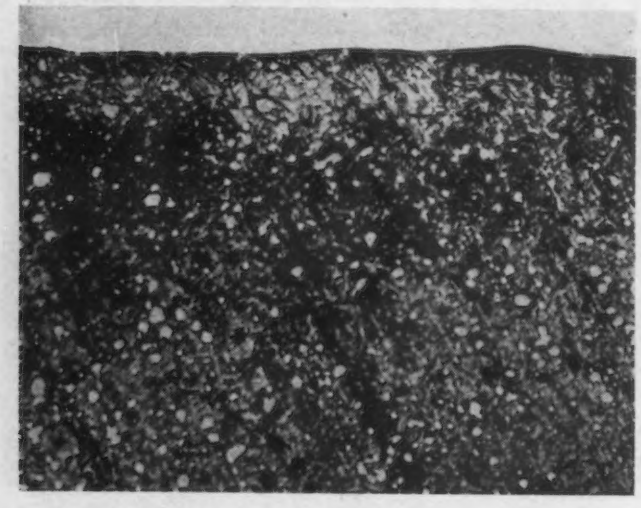
FIG. 1—Thread chaser cutting edge before refrigeration. Note areas near surface indicating retained austenite. Microhardness readings in this area showed a conversion Vickers hardness of 682-707 (59-60 R_c approx.). Etched in 2 per cent nital, 500X.



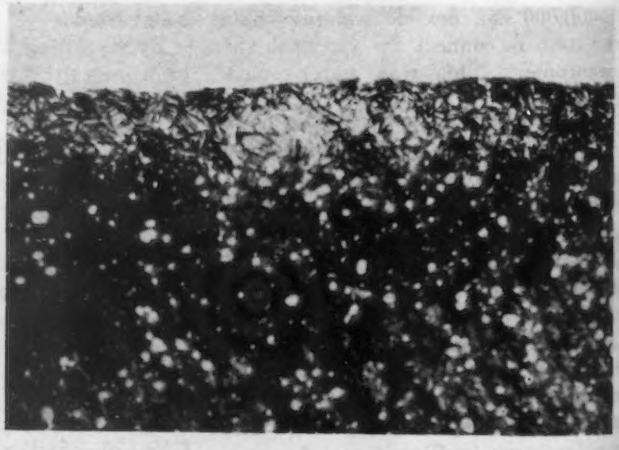


FIG. 2—Same area as shown in Fig. 1, after refrigeration. It is apparent from the microhardness readings converted to Vickers 814-845 (64-66 R_c approx.) that some of the austenite transformed into martensite. Etched in 2 per cent nital, 500X.

By Refrigeration and Nitriding

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. . . Sub-zero refrigeration is being used as a means of reclaiming multipoint high speed steel tools that are too soft in the "as-received" condition. Salt bath nitriding is also being applied in the tool crib as a means of obtaining additional production yield on taps, chasers and milling cutters. Cutting edge finish and tool life are improved by regrinding and honing.

Another example of the application of refrigeration treatment originated with the premature failing of several high speed steel thread chasers. Fig. 1 illustrates one of these chasers in the as-received condition, indicating austenite retention on the cutting edge with a correspondingly low hardness of 59-60 R_c as converted from microhardness values checked at the cutting edge. Fig. 2 shows the same chaser after refrigeration with an acceptable hardness of 64-66 R_c giving an indication of the extent of austenite transformation. A chart on the performance vs. hardness and other contributing factors before and after refrigeration is shown in Table I. This chart serves only to show that refrigeration alone will not guarantee tremendous increases in tool life if the tool was burned during grinding or the finish poor. It is evident that the tool finish* plays a major roll in the production yield of this H.S.S. cutting tool.

**See also "Fine Tool Finish Increases Tool Life 2000 Per Cent," by Carl J. Wiberg and Wesley K. Heath, Wright Aeronautical Corp.,* THE IRON AGE, *July 23, 1942.*

Fig. 3 illustrates improper grinding. The hardness of the "burned" area as checked on a microhardness tester is below the recommended minimum of 63 R_c. The effect of burning during grinding on tool performance is shown in Fig. 4. Note the cold worked appearance of the extreme cutting edge. Fig. 5 illustrates another type of grinding which, while not affecting the as-received hardness, will affect tool life. It is generally conceded that a rough finish of this nature will definitely decrease the cutting efficiency of any tool. Refrigeration under either of the above conditions is of little value.

In the salt bath nitriding of any finished tool, hardness, tool finish and microstructure are of equal importance as in refrigeration. A study of these contributing factors on nitrided tools is summarized as follows:

During the course of these investigations, many tests were run in an attempt to determine the most practicable hardness minimum for tools to be nitrided. On the basis of these tests it was concluded that a minimum of 63 R_c be set on all tools before salt bath nitriding. This minimum was also set for all purchased tools whether they were to be nitrided or not. Data obtained from one of these tests on an end milling cutter are as follows:

End Mill Tool No.	Hardness	Tool Life
B41	61-62 R_c	0 (Shattered 1st cut)
B42	58-60 R_c	0 (Shattered 1st cut)
B43	56-59 R_c	0 (Shattered 1st cut)
B44	61-62 R_c	4 pcs.
B45	64-65 R_c	24 pcs.
B46	63-63.5 R_c	7 pcs.
B47	62-63 R_c	7 pcs.

Note that the tool life increases with hardness and that the dividing line between a good and bad tool apparently falls around 63 R_c. Of course, all types of H.S.S. tools are not subjected to such a severe application as this particular end mill

FIG. 3—Thread chaser lead as received. Arrow indicates "burned" area caused by grinding while forming this lead. Note rough finish on cutting face. The tool life of this chaser was very low. Not polished. Etched in 2 per cent nital, 50X.

FIG. 4—Results of burned cutting edge caused by improper grinding. Note the cold worked appearance of the "rolled-back" edge which occurred on the first cut, causing the tap to cut undersize. Etched in 2 per cent nital, 200X.

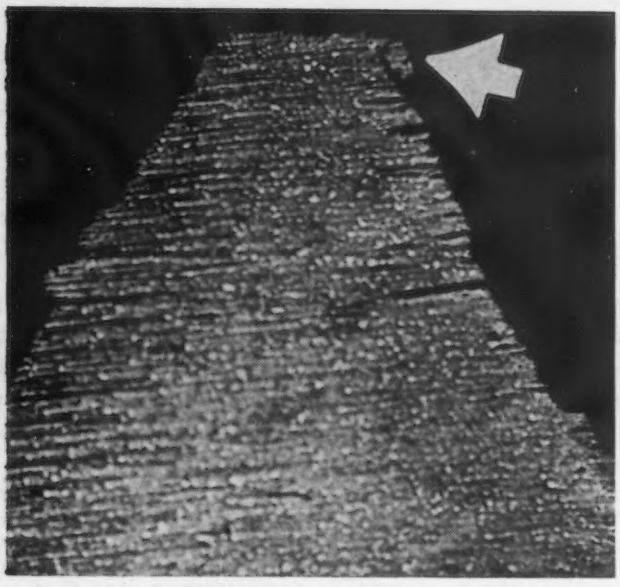

FIG. 5—Cutting face of one tooth of a thread chaser before it was used. Note the rough finish and the smeared appearance of the metal. The tool life can be improved merely by honing and breaking the feather edges. Not polished. Etched in 2 per cent nital, 200X.

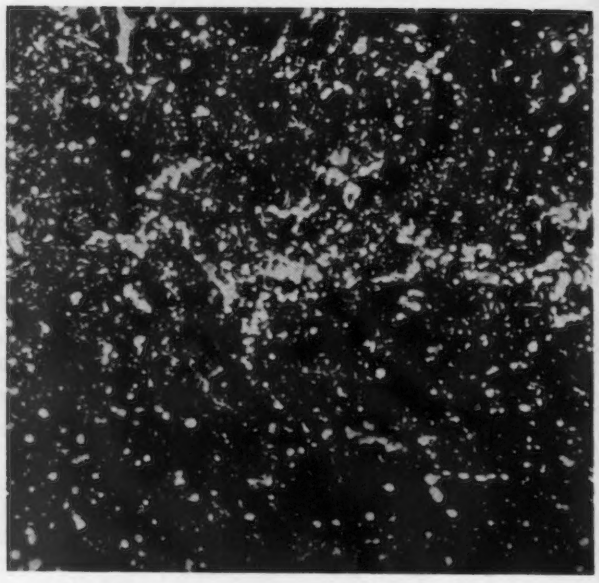

FIG. 6—Note bands of carbides caused by improper carbide segregation. These bands could cause chipping if the tool is subjected to high impact loads. Refer to Fig. 7. Etched in 2 per cent nital, 500X.

TABLE I

Effect of Refrigeration on Performance and Hardness on High Speed Steel Thread Chasers

Chaser Number	Treatment	Average Tool Life, Hr.	Tool Finish	Hardness Before Refrig.	Hardness After Refrig.
1	As received	250	Poor	59-63 R_c	Not Refrig.
2	Refrigerated and honed	425	Poor	63-65 R_c	64-65 R_c
3	Honed	600	Good	64-65 R_c	Not Refrig.
4	Refrigerated	300	Poor	59-62 R_c	63-65 R_c

TABLE II

Increases in Tool Life Obtained by Nitriding

Item No.	Tool Type	Material Cut	Hardness	Nitriding Time Min.	Normal Life, No. Pieces per Grind	Life After Nitriding No. Pieces	Gain Per Cent
1	1 x 14 tap (graded*)	AMS 4140 Forged Aluminum Alloy	75-90 B.H.N. 1000 Kg.	20	4000	13,356	334
2	1 x 14 tap (graded*)			20	4000	13,700	342
3	0.438-20 (graded*)			20	5000	20,607	423
4	0.438-20 (graded*)			20	5000	43,106	862
5	1 x 14 tap (graded*)			20	4000	13,810	345
6	1 x 14 tap (graded*)			20	4000	13,810	345
7	0.438-20 (graded*)			20	5000	18,596	372
8	Mill hob	AMS 6250	20 R_c	20	8-10	38	423
9	Mill hob	AMS 6250	20 R_c	20	8-10	37	412
10	Mill hob	AMS 6250	20 R_c	20	4-6	18	360
11	Thread hob	AMS 6250	40 R_c	20	23-25	244	1020
12	Thread hob	AMS 6250	40 R_c	20	23-25	171	713
13	Straddle mill	AMS 6412	36 R_c	20	9	38	422
14	End mill	AMS 6250	20 R_c	20	7	24	343

*Graded as to class of thread cut by actual test and measurement of tapped hole in material noted.

but the examples given above prove that the hardness of a tool is very important, since it serves as an indication of wear resistance as well as of properly applied heat treatment. All other things being equal, such as tool finish, tool form, freedom from quench and grinding cracks, tool grinding technique, etc., the tool life decreases sharply with the hardness. In other words a tool of 65 R_c is much better than a tool of 62 R_c or even 63 R_c.

If nitriding is applied to a tool which is initially too low in hardness, the benefits of the treatment will be lost. When it is desired to nitride a tool that has been rejected because it is less than 63 R_c, the hardness may be increased by refrigeration. Tempering after refrigeration is not necessary since the tool is to be nitrided.

As with refrigeration, tool finish plays a major roll with respect to the production yield of a nitrided tool. Nitriding will not produce a superior tool unless the finish is proper and the feather-edge, if any, is broken.

Importance of Structure

As is evidenced in Fig. 6, the segregated carbide bands running parallel to the center line of the tool are likely to cause chipping near the cutting edge, as shown in Fig. 7. While a banded structure is not desirable, nothing can be done to eliminate this trouble once the tool is down to finished dimensions. The prevention of this problem is one for the tool manufacturer. The normal life of the

straddle mill cutter illustrated in Fig. 7, is approximately (nine) articulated rods per cutter before regrinding, but this cutter machined only seven pieces before the chipping occurred. It was first assumed that the chipping was caused by brittle failure of the nitrided case applied to the tool. Fig. 7 indicates the incorrectness of this assumption. The chipped out portion is about 0.020 in. deep whereas the nitride case depth is 0.0015-0.002 in. Examination of the fractured area showed improper carbide segregation and areas of retained austenite. See Figs. 6 and 8. These low strength, pre-stressed areas failed under the heavy cutting stress exerted on the cutting edge and resulted in chipping.

Another cutter, nitrided in exactly the same manner as the one discussed above, without prior refrigeration, satisfactorily machined 38 articulated rods, which was 29 pieces over the normal tool life of this cutter. It should be noted, however, that the hardness of this particular cutter was 64-66 R_c which indicated that it was properly heat treated, while the hardness of the first cutter was 58-62 R_c. The band of retained austenite shown in Fig. 8 probably resulted from heat treating the tool in a carburizing atmosphere or from a more rapid cooling rate during quenching in this area. It is interesting to note that the case does not stop at this relatively small band of austenite but rather extends from the surface to the same depth shown in the areas which have no band of retained austenite. Although these bands of austenite may have been cause for part of the failure as shown in Fig. 7, it is believed that the main cause was the carbide bands shown in Fig. 6.

FIG. 7—Straddle milling cutter showing chipped edge. Note that the chip depth is about 0.020 to 0.030 in. while the nitrided case depth is not over 0.002 in. as shown in Fig. 8. Magnification 4.5X.

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If all of the previously mentioned imperfections are eliminated and the tool application is correct, substantial increase (from 334 to 1070 per cent) in tool life will usually result from nitriding as shown in the Table II. If, however, these imperfections are not eliminated and the tool application wrong, comparatively low gains will result. The hardness of all the tools listed in Table II were above the previously set minimum of 63 R_c.

In order to obtain a duplication of the increases shown above, it is necessary to rigidly control the nitriding operation and the nitriding equipment.

The advance production unit now in operation at Wright is shown in Fig. 8. The procedures under which these units operate are as follows.

1. Check hardness of tool as near the cutting edge as possible. Do not nitride unless the tool is 63 R_c or more.
2. Handle tools very carefully to prevent fracture of the cutting edge.
3. Suspend the tools on suitable hangers.
4. Degrease thoroughly.
5. Preheat tools at 900 deg. F.

(CONTINUED ON PAGE 168)

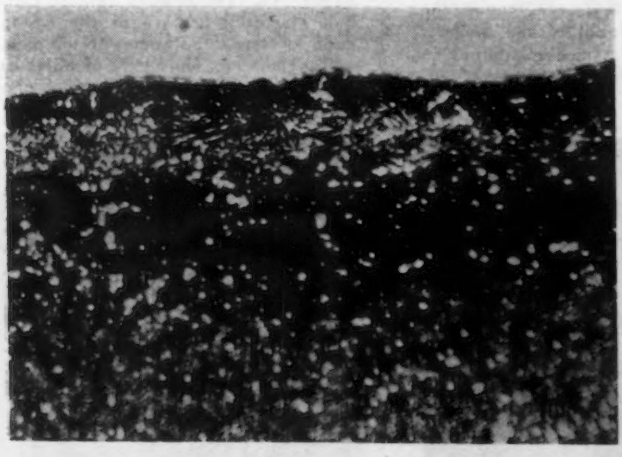
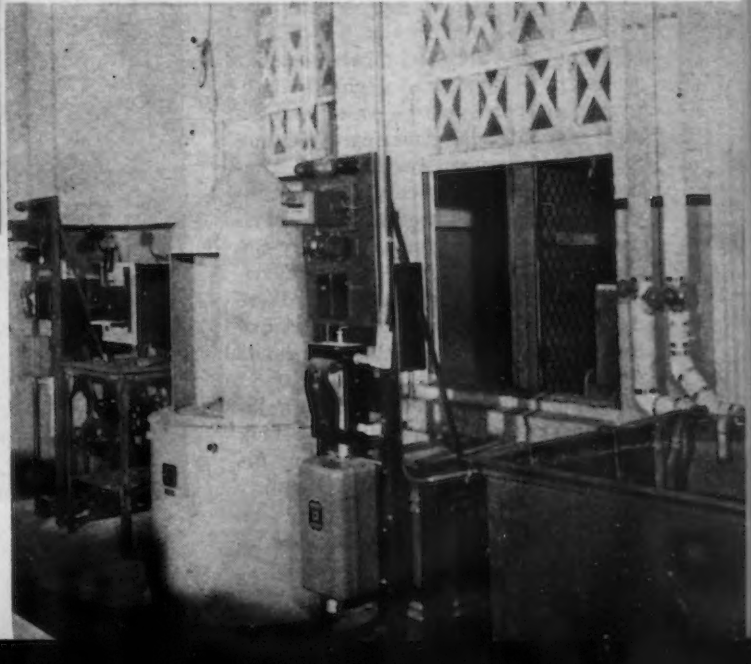


FIG. 8—Nitrided straddle milling cutter. Note the areas indicating the presence of retained austenite. Also note that the nitride case extends to the same depth in the austenite areas as it does in those containing no austenite. Case depth 0.001-0.002 in. Case hardness approx. 68 R_c as converted from microhardness readings at the cutting edge. Core hardness was 58-62 R_c indicating the presence of austenite dispersed throughout the body of the tool. Etched in 2 per nital, 500X.

FIG. 9—View of the equipment used in the production nitriding of various forms of multipoint H.S.S. cutting tools after they are checked for hardness. The tools are preheated in small furnace in left background, after which they are lowered in the salt bath shown immediately left of center and allowed to nitride for the required time. The tools are then removed and allowed to air cool before washing the salt off in the hot water tank at right. The tools are allowed to dry before dipping in corrosion resistant oil.



Metal Congress Theme—

• • • KENT R. VAN HORN, research metallurgist, Aluminum Co. of America, vice-president and president-elect of the American Society for Metals.

As many as 30,000 stalwarts of the metal working industry will crowd into Cleveland next week —if bed and board can be found for them—to skim the cream off technical advancements of the past year at the 1944 National Metal Congress and War Conference Display.

This year's Congress, the 26th, marks the return to a full-blown display, following last year's bob-tailed event, when equipment shown was limited to hotel room showings because of wartime pressure. Nearly 400 exhibitors will show their wares at next week's show in the Cleveland public auditorium, occupying more than 160,000 sq. ft. of floor space. The auditorium's panoply of industrial progress, matched by technical sessions of the Congress held by five principal societies, will make the assembly the largest of its kind yet held.

Three of the technical societies which have sponsored technical programs in past years—American Society for Metals, American Welding Society, American Institute of Mining and Metallurgical Engineers—will be joined this year by the American Industrial Radium and X-Ray Society and the Society for Experimental Stress Analysis. The Wire Association, which previously had joined in the Congress, this year holds a separate meeting at Pittsburgh.

With problems of reconversion bulking larger in the technical man's ken, William H. Eisenman, managing director of the Congress and Display, has chosen "Design for Tomorrow" as the theme of the conclave.

This tarpaulin topic will be implemented by the American Society for Metals by 42 technical papers presented in twelve sessions to be held each morning at the Hotel Statler and by 24 panel meetings at the Auditorium in which current metalworking headline topics will be discussed.

Annual fall meetings of the Iron and Steel and the Institute of Metals divisions of the A. I. M. E. will be held during the first three days of the Congress at the Hotel Statler. Three symposiums—covering "Creep of Non-Ferrous Metals and Alloys," "Recent Developments in Dilatometric Analysis," and "Steelmaking"—will round out general and specialized technical sessions of the two divisions.

The American Welding Society, with headquarters at the Hotel Cleveland, will mull over approximately 60 papers at simultaneous group sessions. Emphasis will be heavy on wartime developments and industries, with three topflight speakers in the shipbuilding, aircraft and ordnance fields describing welding's contribution in the opening session. This will be followed by more specialized topics during the ensuing three days.

The wedding of radiography to the metals field will be celebrated figuratively at technical sessions of the American Industrial Radium and X-Ray Society at the Hollenden Hotel Thursday and Friday. The Cleveland section of the Society will meet Monday evening.

The Society for Experimental Stress Analysis will hold technical sessions Tuesday through Friday at the Hotel Carter grand ballroom. Crankshaft stresses will be the topic of a symposium Wednesday morning. A special Friday afternoon session on electrical strain gage techniques will be capped by a free-for-all open forum.

Departure from didacticism will characterize the Congress as a whole, with free reign being given to conflicting methods and viewpoints. This will be particularly true at the A. S. M.-sponsored panel meetings,

• • • H. J. FRENCH, ASM national president in 1942-1943, will receive the Past President's Medal of the Society. He is, at present, senior consultant in the metallurgical and specifications section, WPB.

• • • GEORGE R. FITTERER, who will deliver the 1944 Edward deMille Campbell Memorial Lecture of the ASM, is head of the department of metallurgical engineering, University of Pittsburgh. His special field is the physical chemistry of steelmaking.

DESIGN for TOMORROW

. . . Next week's National Metal Congress in Cleveland will equal any pre-war event, with a full showing of technical and industrial equipment and a surfeit of technical papers sponsored by five technical societies. Highlight of the program will again be the A.S.M. panel discussions ranging through 24 fields of technology.

• • • M. A. GROSSMANN, director of research, Carnegie-Illinois Steel Corp., president of the American Society for Metals.

where authorities on metal topics of the times exchange views and experiences informally. Later the meetings are thrown open to questions and discussion from the floor, often providing verbal bombing of previously conceived ideas.

Some of the panel topics listed for discussion in the music hall and ballroom of the Public Auditorium at afternoon and evening sessions are "Sub-Zero Treatments," "The Hardenability Band as a Basis for Purchase and Use of Steel," "National Emergency Steels and Hardenability Specifications from the Consumer's Standpoint," "Light Weight Construction," "What's New in the Study of Corrosion," "Products from Metal Powders," and "Induction Heating—Electronics in Overalls." Others of the 24 panel meetings will consider steel production and heat treating problems, instruments for quality control, light metals, improved gray iron castings, surface finishes and treatments, and metals for railroads.

An innovation at last year's Congress, a "Victory Hour," will be retained this year. All A. S. M. sessions will be adjourned at 11:30 each morning, except Wednesday, to the Statler ballroom to hear inspirational talks on subjects vital to the national welfare by nationally prominent speakers representing the armed forces and industry. Monday, Capt. T. A. Solberg, U. S. N., head, bureau of research and standards branch, Bureau of Ships, will speak. Walter S. Tower, president, American Iron and Steel Institute, will address Tuesday's meeting; Maj. Gen. G. M. Barnes, chief of research and development service, Office of the Chief of Ordnance, will talk Thursday; and Lt. Col. William Walter Phelps, area representative, A.A.F. materiel command, will take the rostrum Friday.

The Edward de Mille Campbell Memorial Lecture, always a highlight of the A. S. M. program, will be delivered Wednesday morning in the Statler ballroom, following the Society's annual business meeting. G. R. Fitterer, this year's honored speaker, is professor and head, department of metallurgical engineering, University of Pittsburgh. His researches have developed the now widely-used silicomanganese scavenging deoxidizers, the silicon deoxidation constant, the electrolytic extraction method for nonmetallic inclusions and the carbon-silicon carbide thermocouple for liquid metals.

The Robert F. Mehl lecture will be delivered before the X-Ray group on Thursday afternoon by George L. Clark, head of the department of chemistry at the University of Illinois, who has chosen as his subject, "Experimental Stress Analysis in Radiographically Sound Materials." The Adams Lecture before the American Welding Society will be presented Monday evening by A. B. Kinzel. His topic will be "Solid Phase Welding."

Dinner meetings of three of the societies will be the occasions of bringing organizational work to a head, in some cases by presentation of honors to leaders in technical achievement.

At the A. S. M. dinner Thursday

• • • WALTER E. JOMINY, who will receive the Albert Sauveur Achievement Award at the ASM annual dinner in recognition for his work in developing the end-quench hardenability test.

• • • R. C. STANLEY, president, International Nickel Co. of Canada, Ltd., has been designated to receive the ASM Medal for the Advancement of Research. Award will be made at the ASM annual dinner.

at the Statler, Walter E. Jominy, chief metallurgist, Dodge Chicago Division of Chrysler Corp., widely known for his work in the field of hardenability and developer of the end-quench test, will receive the Albert Sauveur Achievement Award, which recognizes "a metallurgical achievement which has stimulated other organized work along similar lines to such an extent that a marked advance has been made in metallurgical knowledge." The A. S. M. Medal for the Advancement of Research will be presented to Robert C. Stanley, president of International Nickel Co. of Canada, Ltd. The Henry Marion Howe Medal for the best paper to appear in A. S. M. "Transactions" will be awarded jointly to Earnshaw Cook, J. A. Fellows, and R. A. Flinn of American Brake Shoe Co., Mahwah, N. J. No award of the gold medal will be made this year, but Herbert J. French, president of the Society in 1942-43, will receive the Past President's Medal. Maj. George Fielding Eliot will address the meeting on world military events.

The metals divisions of the A. I. M. E. will hold their annual dinner Tuesday at the Statler, with James F. Lincoln, president, Lincoln Electric Co., as speaker. The S. E. S. A. annual dinner is scheduled for Thursday at the Carter.

Other meetings scheduled concurrently with the Congress include alumni luncheons to be held by 13 technical schools; the annual business meeting of the International Acetylene Association at luncheon Wednesday at the Statler; a technical session at 2 p. m. Tuesday in the Auditorium and a business meeting Wednesday morning at the Statler by the Metal Powder Association; a luncheon Wednesday at the Statler by Canadian chapters of the A. S. M.; a breakfast Wednesday at the Hollenden by the industrial and commercial gas section of the American Gas Association; and a regular meeting Thursday noon at the Cleveland of the Resistance Welders Manufacturers Association.

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. . . Correlated Technical

Monday, Oct. 16

9:30 A.M.

"Practical Aspects of the Selection of Frequency and Time Cycles for the Processing of Metallic Parts with Induction Heating," by W. E. Benninghoff and H. B. Osborn, Jr., Ohio Crankshaft Co., Surface Hardening Session, A.S.M., Hotel Statler.

"Rates of Tempering in Cobalt Steels," by E. A. Loria, Carnegie-Illinois Steel Corp., Hardenability Session, A.S.M., Hotel Statler.

"A Survey of Wrought Magnesium Alloy Fabrication," by J. V. Winkler, Dow Chemical Co., Non-Ferrous Metals Session, A.S.M., Hotel Statler.

Presentation of Medals and Prizes: A.W.S., Hotel Cleveland.

10:00 A.M.

"Induction Hardening of Plain Carbon Steels," by D. L. Martin and F. E. Wiley, General Electric Co., Surface Hardening Session, A.S.M., Hotel Statler.

"Isothermal Transformation aand End-Quench Hardenability of Some NE Steels," by R. L. Rickett, J. G. Cutton, C. B. Bernhart, Jr., and J. R. Millikin, U. S. Steel Corp., Hardenability Session, A.S.M., Hotel Statler.

"The Copper-Manganese Equilibrium System," by R. S. Dean, J. R. Long, T. R. Graham, E. V. Potter and E. T. Hayes, Bureau of Mines, Non-Ferrous Metals Session, A.S.M., Hotel Statler.

"Welding as an Aid in Shipbuilding Construction," by Admiral H. L. Vickery, U. S. Maritime Commission, Welding Aids the War Effort Session, A.W.S., Hotel Cleveland.

10:30 A.M.

"Shot for Metal Peening," by O. E. Harder and J. T. Gow, Battelle Memorial Institute, Surface Hardening Session, A.S.M., Hotel Statler.

"Further Developments of the End-Quench Hardenability Test," by C. R. Wilks, Earnshaw Cook and Howard S. Avery, American Brake Shoe Co., Hardenability Session, A.S.M., Hotel Statler.

"Properties of Transitional Structure in Copper-Manganese Alloys," by R. S. Dean, E. V. Potter and J. R. Long, Bureau of Mines, Non-Ferrous Metals Session, A.S.M., Hotel Statler.

"Welding as an Aid in the Fabrication of Ordnance Equipment," by Col. S. B. Ritchie, Office, Chief of Ordnance, Welding Aids the War Effort Session, A.W.S., Hotel Cleveland.

"The Relationship Between Magnesium Core Sand Mixtures and the Burning of Magnesium," by O. J. Myers, Wright Aeronautical Corp., Magnesium Session, A.I.M.E. Metals Division, Pine Room, Hotel Statler.

11:00 A.M.

"A Hardenability Test for Low Carbon and Shallow Hardening Steels," by O. W. McMullan, Youngstown Sheet & Tube Co., Hardenability Session, A.S.M., Hotel Statler.

"Age Hardening Copper-Manganese-Nickel Alloys," by R. S. Dean, J. R. Long, T. R. Graham, and C. W. Matthews, Bureau of Mines, Non-Ferrous Metals Session, A.S.M., Hotel Statler.

"Welding in Aircraft Construction," by W. B. Stout, Consolidated-Vultee Aircraft Corp., Welding Aids the War Effort Session, A.W.S., Hotel Cleveland.

"Solubility of Manganese in Magnesium," by N. Tiner, Permanente Metals Corp., Magnesium Session, Metals Division, A.I.M.E., Hotel Statler.

11:30 A.M.

A.S.M. Victory Session, Hotel Statler.

2:00 P.M.

A.S.M. group discussion meetings, Music Hall and Ballroom of Public Auditorium.
(1) *Metal Cutting and Tool Materials.*
(2) *Light Weight Construction.*

"Fundamentals of Heavy Cutting," by G. L. Walker and H. G. Hughey, Air Reduction Sales Co., Welding and Cutting in Heavy Industries Session, A.W.S., Hotel Cleveland.

"Welding of Aluminum Tank Cars," by A. H. Woollen, Railroad Sales, Aluminum Co. of America, Railroad and Transportation Session, A.W.S., Hotel Cleveland.

"Welding of Manganese Steels," by W. B. Brooks and A. G. Waggoner, Cramp Shipbuilding Co., Weldability Session, A.W.S., Hotel Cleveland.

"Grain Size and Properties of Sand Cast Magnesium," by R. S. Busk and C. W. Phillips, Dow Chemical Co., A.I.M.E. Metals Division, Pine Room, Hotel Statler.

"Recovery of Cold Worked Aluminum-Iron as Detected by Changes in Magnetic Properties," by J. S. Stanley, Westinghouse Electric & Mfg. Co., A.I.M.E. Iron and Steel Division, Pine Room, Hotel Statler.

2:30 P.M.

"Factors Affecting Grain Growth in Germination of Magnesium Alloy Castings," by A. T. Peters, R. S. Busk and H. E. Elliott, Dow Chemical Co., A.I.M.E. Metals Division, Hotel Statler.

"Steel Mill Maintenance," by E. W. Gruber, Wheeling Steel Corp., Welding and Cutting in Heavy Industries Session, A.W.S., Hotel Cleveland.

"Railroad Welding," by John McMullen, Erie Railroad, Railroad and Transportation Session, A.W.S., Hotel Cleveland.

"High Tensile Manganese-Silicon Steels for Welded Fabrication," by G. G. Luther and F. H. Laxar, Naval Research Laboratory, Weldability Session, A.W.S., Hotel Cleveland.

2:30 P.M.

"Distribution of Carbon Between Titanium and Iron in Steels," by W. P. Fishel and Bryson Robertson, Vanderbilt University, General Session, A.I.M.E. Iron and Steel Division, Pine Room, Hotel Statler.

3:00 P.M.

"Transformation of Austenite in a 3 per cent Chromium, 1 per cent Carbon Steel," by E. P. Klier, Penn State College, General Session, A.I.M.E., Iron and Steel Division, Pine Room, Hotel Statler.

"Unusual Applications of Gas Cutting in Ordnance Fabrication," by C. M. Underwood, Northern Ordnance, Inc., Welding and Cutting in Heavy Industries Session, A.W.S., Hotel Cleveland.

"The Bead-Weld Nick-Bend Test for Ductility," by C. E. Jackson and G. G. Lutser, Naval Research Laboratory, Weldability Session, A.W.S., Hotel Cleveland.

"Grain Size of Sand Cast Magnesium Alloys," by Oscar Blohm, Hills-McCanna Co., A.I.M.E., Metals Division, Hotel Statler.

3:30 P.M.

"Procedure Control of Automatic Welding Processes," by A. E. Bedell and J. B. Quigley, Graver Tank & Mfg. Co., Inc., Welding and Cutting in

Program 26th National Metal Congress

Heavy Industries Session, A.W.S., Hotel Cleveland.

"The Influence of Minor Variables of Weldability," by R. D. Stout, S. S. Tor and G. E. Doan, Lehigh University, Weldability Session, A.W.S., Hotel Cleveland.

4:00 P.M.

A.S.M. Group Discussion meetings, Music Hall and Ballroom of Public Auditorium.
(1) *"Sub-Zero Treatments."*
(2) *"Surface Finishes and Protection."*

6:30 P.M.

"Use of Microradiography in Identifying Defects in Castings," by L. W. Ball, Triplett & Barton Corp., Hotel Hollenden. Cleveland Section meeting, American Industrial Radium and X-Ray Society.

8:00 P.M.

"Solid Phase Welding," by A. B. Kinzel, Union Carbide & Carbon Corp., Adams' Lecture Section, A.W.S., Hotel Cleveland.

8:30 P.M.

A.S.M. Group Discussion meetings, Music Hall and Ballroom, Public Auditorium.
(1) *"Induction Heating (Electronics in Overalls)."*
(2) *"What's New in the Study of Corrosion."*

Tuesday, Oct. 17

9:30 A.M.

"The Mechanism of Failure of 18 Cr, 8 Ni Cracking Still Tubes," by C. L. Clark, Timken Roller Bearing Co., and J. W. Freeman, University of Michigan, Physical Properties session, A.S.M., Hotel Statler.

"The Effect of Carbon Content on Hardenability," by E. S. Rowland, J. Welchner, R. G. Hill and J. J. Russ, Timken Roller Bearing Co., Hardenability Session, A.S.M., Hotel Statler.

"New Developments in High Strength Aluminum Alloy Products," by E. H. Dix, Jr., Aluminum Co. of America, Aluminum and Magnesium Alloys Session, A.S.M., Hotel Statler.

"Spot Welding Machines for Heavy Gages of Ferrous and Non-Ferrous Metals," by Mario Sciaky, Sciaky Bros., Resistance Welding session, A.W.S., Hotel Cleveland.

"The Effect of Postheating in Welding Alloy Steels," by M. A. Pugacz and G. J. Siegel, Naval Research Laboratory, Research Session, A.W.S., Hotel Cleveland.

"Standard Details for Welded Building Construction," by H. W. Lawson, Bethlehem Steel Co., Structural Session, A.W.S., Hotel Cleveland.

"Application of Non-Ferrous Alloys in Stress Design," by J. J. Kanter, Crane Co., and

"Creep Test Methods and the Interpretation of Creep Data," by P. G. McVetty, Westinghouse Electric & Mfg. Co., Metals and Alloys Session, A.I.M.E. Metals Division, Hotel Statler, Euclid Room.

10:00 A.M.

"Capillarity of Metallic Surfaces," by E. R. Parker, University of California, and R. Smoluchowski, General Electric Co., Physical Properties Session, A.S.M., Hotel Statler.

"Air-Hardenability of Steels," by C. B. Post, M. C. Fetzer, and W. H. Fenstermacher, Carpenter Steel Co., Hardenability session, A.S.M., Hotel Statler.

"Aluminum Alloy Forging Materials and Design," by L. W. Davis, Aluminum Co. of America, Aluminum and Magnesium Alloys Session, A.S.M., Hotel Statler.

"Heat Transfer Across Contact Surfaces," by W. B. Kouwenhoven, Dean, School of Engineering, Johns Hopkins University, Resistance Welding Session, A.W.S., Hotel Cleveland.

"Stress Relieving Study," by Prof. J. R. Stitt, Ohio State University, Research session, A.W.S., Hotel Cleveland.

"Field Welded Pressure and Variable Volume Storage Tanks," by Fred L. Plummer, Hammond Iron Works, Structural Session, A.W.S., Hotel Cleveland.

"Shot Peening to Improve Fatigue Resistance," by O. J. Horger and H. R. Neifert, Timken Roller Bearing Co., Society for Experimental Stress Analysis, Grand Ballroom, Hotel Carter.

"Creep Characteristics of a Phosphorized Copper," by N. L. Burghoff and A. I. Blank, Chase Brass & Copper Co., Metals and Alloys Session, A.I.M.E. Metals Division, Hotel Statler, Euclid Room.

"Measurement and Control of Hydrogen Embrittlement in Type 440C Stainless Steel Wire," by C. A. Zapffe and M. Eleanor Haslein, Rustless Iron & Steel Corp., General Session, A.I.M.E. Iron and Steel Division, Hotel Statler, Pine Room.

10:30 A.M.

"The Effect of Fiber on Notched Bar Tensile Strength Properties of a Heat Treated Low Alloy Steel," by G. Sachs, J. D. Lubahn, L. J. Ebert and E. L. Aul, Case School of Applied Science, Physical Properties session, A.S.M., Hotel Statler.

"The Partition of Molybdenum in Steel and Its Relation to Hardenability," by Fred E. Bowman, Climax Molybdenum Co., Hardenability Session, A.S.M., Hotel Statler.

"The Properties of Aluminum Alloys Melted in an Induction Heated Crucible Furnace," by James W. Poynter, Army Air Forces, Wright Field, Aluminum and Magnesium Alloys Session, A.S.M., Hotel Statler.

"Problems in Spot Welding Heavy Mild Steel Plate," by F. R. Hensel, E. I. Larsen and E. F. Holt, P. R. Mallory & Co., Inc., Resistance Welding Session, A.W.S., Hotel Cleveland.

"The Effects of Metallurgical Changes Due to Heat Treatment Upon the Fatigue Strength of Carbon-Steel Plates," by W. H. Bruckner and W. H. Munse, University of Illinois, Research Session, A.W.S., Hotel Cleveland.

"Plastic-Flow Problems by Photo-Grid Methods," by J. F. Harding and C. P. O'Haven, Armour Research Foundation, Society for Experimental Stress Analysis, Grand Ballroom, Hotel Carter.

"Creep Properties of Cold Drawn Annealed 'B' Monel and Inconel," by B. B. Betty, H. L. Eiselstein and P. P. Huston, Jr., International Nickel Co., and

"Notes on the Elevated Temperature Properties of Some Cast Copper-Base Alloys," by H. E. Montgomery, The Lunkenheimer Co., Metals and Alloys Session, A.I.M.E. Metals Division, Euclid Room, Hotel Statler.

"Effect of Time Storage on Ductility of Welded Test Specimens," by C. E. Jackson and G. G. Luther, Naval Research Laboratory, A.I.M.E., Iron and Steel Division, Pine Room, Hotel Statler.

11:00 A.M.

"The Effects of Notches of Varying Depth on the Strength of Heat Treated Low Alloy Steels," by G. Sachs, J. D. Lubahn and L. J. Ebert, Case School of Applied Science, Physical Properties Session, A.S.M., Hotel Statler.

"The Rate of Diffusion of Molybdenum in Austenite and in Ferrite," by John L. Ham, Climax Molybdenum Co., Hardenability Session, A.S.M., Hotel Statler.

"Magnesium Sheet," by P. T. Stroup and G. F. Sager, Aluminum Co. of America, and J. B. West, American Magnesium Corp., Aluminum and Magnesium Alloys Session, A.S.M., Hotel Statler.

"Load Distribution in Riveted and Spot-Welded Joints," by M. Goland and L. D. Morris, Curtiss-Wright Corp., S.E.S.A., Grand Ballroom, Hotel Carter.

"Creep Data on Die Cast Zinc Alloy," by E. H. Kelton and B. B. Grissinger, New Jersey Zinc Co., and *"Creep Properties of Some Rolled Lead Alloys,"* by A. A. Smith, Jr., American Smelting & Refining Co., Metals and Alloys symposium session, A.I.M.E., Metals Division, Euclid Room, Hotel Statler.

11:30 A.M.

A.S.M. Victory Session, Hotel Statler.

2:00 P.M.

A.S.M. Group Discussion meeting, Music Hall and Ballroom, Public Auditorium.
(1) *"The Hardenability Band as a Basis for Purchase and Use of Steel"* (John Mitchell, Carnegie-Illinois Steel Corp., presenting manufacturers viewpoint; A. L. Boegehold, General Motors Research Labs., presenting consumer's attitude).
(2) *"Magnesium."*

"Low Reactance Cable for Portable Resistance Welders," by Myron Zucker, Mackworth G. Rees, Inc., Resistance Welding session, A.W.S., Hotel Cleveland.

"Some Recent Developments in Stainless Steel Welding," by D. L. Mathias, Metal & Thermit Corp., Research session, A.W.S., Hotel Cleveland.

"Controls Required for Safe and Economical Construction of Welded Ships," by D. G. Maxson, Welding Consultant, Marinship Corp., Ships session, A.W.S., Hotel Cleveland.

"Tin Smelting and Metallurgy," by C. L. Mantell, Consulting Chemical Engineer, Non-Ferrous Production Metallurgy session, A.I.M.E., Metals Division, Lattice Room, Hotel Statler.

"Dilatometric Analysis of Sub-atmospheric Transformations," by R. D. Potter, Massachusetts Institute of Technology. Symposium on Developments in Dilatometric Analysis, A.I.M.E., Iron and Steel Division, Pine Room, Hotel Statler.

Technical Session, The Metal Powder Association, Meeting Room A, Public Auditorium.

2:30 P.M.

"The Flash Welding of Alloy Steels—Welding Techniques and Variables," by J. J. Riley; Metallurgical and Physical Characteristics, by J. C. Barrett, Taylor-Winfield Corp., Resistance Welding session, A.W.S., Hotel Cleveland.

"Bi-axial Fatigue Strength of Low-Carbon Steels," by George K. Morikawa and LeVan Griffis, Illinois Institute of Technology, Research session, A.W.S., Hotel Cleveland.

"Technical Control of Welding in Ship Construction," by M. H. MacKusick, California Shipbuilding Corp., Ships session, A.W.S., Hotel Cleveland.

"Beryllium," by Donald M. Liddell, Con-

sulting Engineer, Non-Ferrous Production Metallurgy Session, A.I.M.E., Metals Division, Lattice Room, Hotel Statler.

"A High-speed Dilatometer and the Transformational Behavior of Six Steels," by A. L. Christiansen, E. C. Nelson, and C. E. Jackson, Naval Research Laboratory, Symposium on Developments in Dilatometric Analysis, A.I.M.E., Iron and Steel Division, Pine Room, Hotel Statler.

"Residual Stress Studies of Life Improving Surface Treatments," by R. W. Greaves, E. C. Kirstowsky and C. Lipson, Chrysler Corp., S.E.S.A., Grand Ballroom, Hotel Carter.

3:00 P.M.

"Small Portable Condenser Welding Set," by E. M. Callender, E. G. Budd Mfg. Co., Resistance Welding session, A.W.S., Hotel Cleveland.

"Weldability Tests of Cast Steel," by C. E. Jackson and F. S. McKenna, Naval Research Lab., Research session, A.W.S., Hotel Cleveland.

"Evolution of Welding in Shipbuilding," by M. N. Maltseff, Western Pipe and Steel Co., Ships session, A.W.S., Hotel Cleveland.

"Antimony: Its Metallurgy and Refining," by Chung Yu Wang, Wah Chang Trading Corp., and Guy C. Riddell, Consulting Mining Engineer, Non-Ferrous Production Metallurgy session, A.I.M.E. Metals Division, Lattice Room, Hotel Statler.

"Precise Expansion Measurements on Non-Ferrous Alloys and Glasses," by W. E. Kingston, Sylvania Electric Products, Inc., Symposium on developments in Dilatometric Analysis, A.I.M.E., Iron and Steel Division, Pine Room, Hotel Statler.

"New Approaches to Engineering Design," by E. E. Stilson, R. H. Peterson and R. C. Pocock, Bendix Aviation Corp., S.E.S.A., Grand Ballroom, Hotel Carter.

3:30 P.M.

"Weldability—As-Rolled vs. Heat-Treated High Strength Construction Steels," by Lt. S. A. Herres and W. L. Warner, Watertown Arsenal, Research session, A.W.S., Hotel Cleveland.

"Multiple and Stack Machine Cutting," by A. H. Yoch, Air Reduction Sales Co., Ships session, A.W.S., Hotel Cleveland.

"Modern Quicksilver Reduction Plants," by G. I. Gould, H. W. Gould & Co., Non-Ferrous Production Metallurgy session, A.I.M.E., Metals Division, Lattice Room, Hotel Statler.

"An Interference Type Dilatometer and Some Typical Results," by W. L. Fink and L. A. Willey, Aluminum Co. of America, Symposium on developments in Dilatometric Analysis, A.I.M.E., Iron and Steel Division, Pine Room, Hotel Statler.

4:00 P.M.

A.S.M. Group Discussion Meeting, Music Hall and Ballroom, Public Auditorium.
(1) *"Instruments for Quality Control—Measurement of Linear Dimensions."*
(2) *"Surface Peening to Increase Fatigue Resistance."*

7:00 P.M.

A.I.M.E., Metals Division, Annual Fall Dinner, Euclid Room, Hotel Statler.

8:00 P.M.

University Research Conference, A.W.S., Hotel Cleveland.

8:30 P.M.

A.S.M. Group Discussion Meeting—Music Hall and Ballroom, Public Auditorium.
(1) *"National Emergency Steels and Hardenability Specifications from the Consumer's Standpoint."*
(2) *"Tin; Tin Alloys; Tin Coatings."*

Wednesday, Oct. 18

7:30 A.M.

Chapter Chairmen's Breakfast, A.S.M., Hotel Statler.

8:30 A.M.

American Gas Association, breakfast, round table, talks, Assembly Room, Hollenden Hotel.

9:30 A.M.

Annual Meeting of American Society for Metals.

1944 Edward de Mille Campbell Memorial Lecture, by G. R. Fitterer, Professor and Head, Department of Metallurgical Engineering, University of Pittsburgh, Ball room, Hotel Statler.

"Impact Strength of Arc Welded Joints in Aircraft Steel," by H. O. Klinke, Republic Aviation Corp., Aircraft session, A.W.S., Hotel Cleveland.

"Intergranular Corrosion of Stainless Steel Welds," by William T. Tiffin, University of Oklahoma, Research session, A.W.S., Hotel Cleveland.

"The Tee-Bend Energy Weldability Test," by L. C. Bibber and J. Heuschkel, Carnegie-Illinois Steel Corp., Weldability Research Committee meeting, A.W.S., Hotel Cleveland.

10:00 A.M.

"Helium Shielded Arc Welding of Exhaust Collector Rings," by Francis H. Stevenson, Lockheed Aircraft Corp., Aircraft session, A.W.S., Hotel Cleveland.

"The Effect of Time and Temperature on the Relief of Residual Stresses in Low Alloy Steels," by J. K. McDowell and Lt. Col. Paul C. Cunnick, Rock Island Arsenal, Research session, A.W.S., Hotel Cleveland.

10:00 A.M.

"Structural Evolution of a Crankshaft," by S. Oldberg and C. Lipson, Chrysler Corp., *Symposium on Crankshaft Stresses,* S.E.S.A., Grand Ballroom, Hotel Carter.

10:30 A.M.

"Development and Application of Modern Heavy Coated Arc Welding Electrodes," by D. C. Smith and W. G. Rinehart, Harnischfeger Corp., Research session, A.W.S., Hotel Cleveland.

"Multi-Arc Welding of Aluminum Alloys," by M. R. Rivenburgh and C. W. Steward, Curtiss-Wright Corp., Aircraft session, A.W.S., Hotel Cleveland.

"Determination of Operating Loads and Stresses in Crankshafts," by A. Goloff, Caterpillar Tractor Co., Symposium on Crankshaft Stresses, S.E.S.A., Grand Ballroom, Hotel Carter.

11:00 A.M.

"Load Distribution in Riveted and Spot-Welded Joints," by M. Goland and L. D. Morris, Curtiss-Wright Corp., S.E.S.A., Grand Ballroom, Hotel Carter.

"Metallurgical Processing of Packard Built Rolls-Royce Crankshafts," by M. L. Frey, Packard Motor Car Co., *Symposium on Crankshaft Stresses,* S.E.S.A., Hotel Carter, Grand Ballroom.

12:00 Noon

Canadian Luncheon, A.S.M., Ballroom, Hotel Statler.

12:15 P.M.

Annual Business Meeting and luncheon of International Acetylene Association, Euclid Room, Hotel Statler.

2:00 P.M.

"The Geometry of a Spot Welding Tip and Its Relation to Tip Life," by E. D. Crawford and C. W. Steward, Curtiss-Wright Corp., Aircraft session, A.W.S., Hotel Cleveland.

"Production Problems and Production Control," by E. C. Brekelbaum, Harnischfeger Corp., Machinery session, A.W.S., Hotel Cleveland.

"Pressure Vessel Welding," by Edward B. McGuire, Hamler Boiler & Tank Co., Piping and Pressure Vessels session, A.W.S., Hotel Cleveland.

A.S.M. Group Discussion Meetings, Music Hall and Ballroom of Public Auditorium.
(1) *"Metals for Railroads."*
(2) *"New Trends in Metallurgical Heating."*

"Theoretical and Practical Aspects of Deoxidation in Basic Open Hearth Practice," by T. S. Washburn, Inland Steel Co., Symposium on Steelmaking, A.I.M.E. Iron and Steel Division, Euclid Room, Hotel Statler.

"Orientation Structure on the Surface of Cast Metals," by Gerald Edmunds, New Jersey Zinc Co., A.I.M.E., Metals Division, Pine Room, Hotel Statler.

2:30 P.M.

"Survey of Chemical Cleaning Practices for Spot Welding Aluminum Alloys," by F. M. Morris, Kaiser Cargo, Inc., Fleetwings Div., Aircraft session, A.W.S., Hotel Cleveland.

"Routine Inspection and Salvage of Machinery Weldments—Rough, Partially Machined and Machined," by James W. Owens, Fairbanks, Morse & Co., Machinery session, A.W.S., Hotel Cleveland.

"Normalizing of Welds in Carbon-Molybdenum Steel Pipe by 60-Cycle Induction Heating," by I. A. Rohrig and D. H. Corey, The Detroit Edison Co., Pipe and Pressure Vessels session, A.W.S., Hotel Cleveland.

"Slag-Metal-Oxygen Relationships in the Basic Open Hearth and Electric Processes," by J. S. Marsh, Bethlehem Steel Co., Symposium on Steelmaking, A.I.M.E., Iron and Steel Division, Euclid Room, Hotel Statler.

"The Hardness of Silver-Antimony Solid Solutions," by R. M. Treco and J. H. Frye, Lehigh University, A.I.M.E., Metals Division, Pine Room, Hotel Statler.

"Full Scale Fatigue Testing of Crankshafts," by C. W. Gadd and N. A. Ochiltree, General Motors Research Laboratories, Symposium on Crankshaft Stresses, S.E.S.A., Grand Ballroom, Hotel Carter.

3:00 P.M.

"An Evaluation of Process Control of Aircraft Welding," by P. H. Merriman, The Glenn L. Martin Co., Aircraft Session, A.W.S., Hotel Cleveland.

"Welded Jigs and Fixtures," by A. N. Kugler, Air Reduction Sales Co., Machinery Session, A.W.S., Hotel Cleveland.

"Properties of Welded Joints Between Dissimilar Metals," by E. C. Chapman and R. E. Lorentz, Combustion Engineering Co., Piping and Pressure Vessels Session, A.W.S., Hotel Cleveland.

"Substitute Solders of the 85-15 Lead-Tin Type," by James B. Russell and J. O. Mack, Naval Research Laboratory, A.I.M.E. Metals Division, Pine Room, Hotel Statler.

"A Rapid Laboratory Method for Estimating Basicity of Open-Hearth Slag," by W. O. Philbrook, A. J. Jolly, Jr., and T. R. Henry, Wisconsin Steel Works, Steelmaking Symposium, A.I.M.E. Iron and Steel Division, Euclid Room, Hotel Statler.

"Determining Crankshaft Durability for Increased Performance of In-Line Engine," by W. Osborn, Sterling Engine Co., Crankshaft Stresses Symposium, S.E.S.A., Hotel Carter.

3:30 P.M.

"Application of pH Slag Basicity Measurements to Basic Open-Hearth Phosphorus Control," by Michael Tenenbaum and C. C. Brown, Inland Steel Co., Steelmaking Symposium, A.I.M.E. Iron and Steel Division, Euclid Room, Hotel Statler.

"Characteristics of Welding Arcs on Aluminum in Atmospheres of Helium and Argon," by F. A. Wassell, General Electric Co., Aircraft Session, A.W.S., Hotel Cleveland.

"Design of Welded Machinery," by John Mikulak, Electric Machinery Mfg. Co., Machinery Session, A.W.S., Hotel Cleveland.

"Oxy-Acetylene Pressure Welding," by A. R. Lytle, Union Carbide & Carbon Research Laboratories, Piping and Pressure Vessels Session, A.W.S., Hotel Cleveland.

4:00 P.M.

A.S.M. Group Discussion Meetings, Music Hall and Ballroom, Public Auditorium.
(1) *"Products from Metal Powders."*
(2) *"Instruments for Quality Control —Means to Establish Identity."*

6:30 P.M.

A.W.S. Section Officers Dinner and Conference, Hotel Cleveland.

8:30 P.M.

A.S.M. Group Discussion Meetings, Music Hall and Ballroom, Public Auditorium.
(1) *"Instruments for Quality Control —Detection and Measurement of Internal Defects."*
(2) *"Manufacture of Quality Steels."*

Thursday, Oct. 19

9:30 A.M.

"A Comparison of Aluminum and Titanium Deoxidation for Preventing Strain Aging Embrittlement in Low Carbon Steel," by G. F. Comstock and J. R. Lewis, Titanium Alloy Mfg. Co., Melting and Special Alloys Session, A.S.M., Hotel Statler, Cleveland.

"The Dimensional Stability of Steel— Part I—Sub-atmospheric Transformation of Retained Austenite," by S. G. Fletcher and Morris Cohen, M.I.T., Tool Steel Session, A.S.M., Hotel Statler.

"A Comparison of Microhardness Indentation Tests," by Douglas R. Tate, National Bureau of Standards, Radiography and Testing Session, A.S.M., Hotel Statler.

"Arc Welding Practices in the Steel Foundry," by Frank Kiper and Lawrence Gabes, Ohio Steel Foundry Co., Foundry Session, A.W.S., Hotel Cleveland.

"Low Temperature Joining," by R. D. Wasserman and C. E. Swift, Eutectic Welding Alloys Co., A.W.S., Hotel Cleveland.

10:00 A.M.

"A Study of Subzero Treatments Applied to Molybdenum-Tungsten High Speed Steel," by R. G. Kennedy, Jr., Cleveland Twist Drill Co., Tool Steel Session, A.S.M., Hotel Statler.

"Improved Sensitivity in Double Exposure Radiography," by James Rigbey, Ford Motor Co. of Canada, Radiography and Testing Session, A.S.M., Hotel Statler.

"Machine Cutting of Risers, Flame Scarfing to Remove Padding, and Flame Gouging to Remove Webs and Defects," by G. E. Bellew, Air Reduction Sales Co., Foundry Session, A.W.S., Hotel Cleveland.

"How Much Ductility Is Necessary for a Structure or Machine?", by W. J. Conley, Lincoln Electric Co., A.W.S., Hotel Cleveland.

"Automatic Film Processing and Equipment," by Robert Sarderson, American Industrial Radium and X-Ray Society, Hollenden Hotel.

"X-Ray and Welding Control," by John J. Chyle, American Industrial Radium and X-Ray Society, Hotel Hollenden.

"The Air Reaction in Some Iron-Cobalt Tungsten Alloys and the Same Modified With Chromium," by W. P. Sykes, General Electric Co., Melting and Special Alloys Session, A.S.M., Hotel Statler.

"The Application of Stress Models to Specific Structural Problems," by S. F. Tingley, Goodyear Aircraft Corp., S.E.S.A., Grand Ballroom, Hotel Carter.

10:30 A.M.

"The Basic Electric Melting Procedure for High Quality Alloy Steels," by A. L. Ascik, Sorel Industries, Ltd., Melting and Special Alloys Session, A.S.M., Hotel Statler.

"Experiments of Sodium Cyaniding of High Speed Steel Prior to Hardening," by John McIntyre, International Business Machines Co., Tool Steel Session, A.S.M., Hotel Statler.

"The Interpretation of Radiographs: Particularly of Aircraft Parts," by Leslie W. Ball, Triplett & Barton, Inc., Radiography and Testing Session, A.S.M., Hotel Statler.

"Repair of Castings," by L. A. Danse, Chairman, G. M. Metallurgical Committee, General Motors Corp., Foundry Session, A.W.S., Hotel Cleveland.

"A Practical Comparison of Fluoroscopy with Radiography," by Robert Mayer, American Industrial Radium and X-Ray Society, Hotel Hollenden.

"Electrical Analogy for Shear Lag Problems," by R. E. Newton, Curtiss-Wright Corp., S.E.S.A., Grand Ballroom, Hotel Carter.

11:00 A.M.

"Filtration," by Don M. McCutcheon, American Industrial Radium and X-Ray Society, Hotel Hollenden.

"Electric Method for the Solution of Laplace's Equation," by V. Paschkis, Columbia University, S.E.S.A., Grand Ballroom, Hotel Carter.

11:30 A.M.

A.S.M. Victory Session, Hotel Statler.

12:00 Noon

College Alumni Luncheons—A.S.M., Hotel Statler.

Business meeting—Resistance Welders Mfrs. Assoc., Hotel Cleveland.

2:00 P.M.

A.S.M. Group Discussion Meetings, Music Hall and Ballroom of Public Auditorium.
(1) *"Salt Baths."*
(2) *"New Aluminum Alloys for Peacetime Uses."*

American Industrial Radium and X-Ray Society, Annual Meeting, Mohl Lecture—Election of Officers—Address by Retiring President, Maynard B. Evans, Jr., Hotel Hollenden.

A.W.S. Business Meeting, Hotel Cleveland.

3:00 P.M.

A.W.S.—Board of Directors' Meeting, Hotel Cleveland.

"Experimental Stress Analysis in Radiographically Sound Materials," by George L. Clark, University of Illinois, American Industrial Radium and X-Ray Society, Hotel Hollenden.

4:00 P.M.

A.S.M. Group Discussion Meetings, Music Hall and Ballroom of Public Auditorium.
(1) *"Quality Control by Statistical Methods."*
(2) *"Instruments for Quality Control —Measuring Devices for Atmosphere and Combustion."*

6:30 P.M.

S.E.S.A. Dinner, Grand Ballroom, Hotel Carter.

7:00 P.M.

A.S.M. Annual Dinner, Howe Award, Sauveur Award, Ordnance Distinguished Service Award, Hotel Statler.

Friday, Oct. 20

9:30 A.M.

"Chromium Steels of Low Carbon Content," by Russell Franks, Union Carbide & Carbon Research Laboratories, Chromium and Molybdenum Alloys Session, A.S.M., Hotel Statler.

"Fractography — A New Tool for Metallurgical Research," by Carl A. Zapffe and Mason Clogg, Jr., Rustless Iron and Steel Corp., Fracture and Grain Size Session, A.S.M., Hotel Statler.

"Annealing Studies on Cold-Rolled Iron and Iron Binary Alloys," by C. R. Austin, L. A. Luini and R. W. Lindsay, Pennsylvania State College, Rolling and Graphitization Session, A.S.M., Hotel Statler.

10:00 A.M.

"Characteristics and Properties of Some Cast Chromium-Molybdenum Steels," by N. A. Ziegler and W. L. Meinhart, Crane Co., Chromium and Molybdenum Alloys, A.S.M., Hotel Statler.

"Cleavage Structures of Iron-Silicon Alloys," by Carl A. Zapffe and Mason Clogg, Jr., Rustless Iron and Steel Corp., Fracture and Grain Size Session, A.S.M., Hotel Statler.

"The Effect of Cold Rolling on the Structure of Hadfield Manganese Steel," by Norman P. Goss, Cold Metal Products Co., Rolling and Graphitization Session, A.S.M., Hotel Statler.

"Precision Determination of Weight by Means of Bonded Strain Gages," by A. L. Thurston, Cox & Stevens Aircraft Corp., and R. W. Cushman, The Foxboro Co., S.E.S.A., Grand Ballroom, Hotel Carter.

"Quality Control of Radiographs by a Direct Density Check," by Alvin F. Cota, American Industrial Radium and X-Ray Society, Hotel Hollenden.

10:30 A.M.

"The Segregation of Molybdenum in Phosphorus Bearing Alloyed Gray Cast Iron," by F. B. Rote, Wyman-Gordon Co., and W. P. Wood, University of Michigan, Chromium and Molybdenum Alloys Session, A.S.M., Hotel Statler.

"Grain Shape and Grain Growth," by David Harker, General Electric Co., and Earl R. Parker, University of California, Fracture and Grain Size Session, A.S.M., Hotel Statler.

"Factors Controlling Graphitization of Carbon Steels at Subcritical Temperatures," by C. R. Austin, Pennsylvania State College, and M. C. Fetzer, Carpenter Steel Co., Rolling and Graphitization Session, A.S.M., Hotel Statler.

"A Simplified Method of Film Evaluation," by Emery Meschter, American Industrial Radium and X-Ray Society, Hollenden Hotel.

"The Magnetic Coupled-Torque Meter," by B. F. Langer, Westinghouse Research Laboratories, S.E.S.A., Grand Ballroom, Hotel Carter.

11:00 A.M.

"Fracture Studies of Soldered Joints," by F. Berman and R. H. Harrington, General Electric Co., Fracture and Grain Size Session, A.S.M., Hotel Statler.

"Method of Determining Metal Thickness Radiographically," by H. P. Moyer and P. L. Kline, American Industrial Radium and X-Ray Society, Hotel Hollenden.

"Impact Stress Analysis by Brittle Coatings," by G. Ellis, Magnaflux Corp., S.E.S.A., Grand Ballroom, Hotel Carter.

"Three Dimensional Radiography," by Douglas Wineck, American Industrial Radium and X-Ray Society, Hotel Hollenden.

11:30 A.M.

A.S.M. Victory Session, Hotel Statler.

2:00 P.M.

A.S.M. Group Discussion Meetings, Music Hall and Ballroom of Public Auditorium.
(1) *"Heat Treatment."*
(2) *"Improved Gray Iron Castings."*

"Requirements in Specifications for Uniform Radiographic Technique," by George A. Russ, American Industrial

Radium and X-Ray Society, Hotel Hollenden.

2:30 P.M.

"Electric Gaging Systems: Their Selection and Application," by H. C. Robert, University of Illinois, Special session on Electrical Strain Gage Techniques, S.E.S.A., Grand Ballroom, Hotel Carter.

"The Use of Static Tests as a Method of Determining the Radiographic Classification of Castings," by F. S. Wyle, American Industrial Radium and X-Ray Society, Hotel Hollenden.

3:00 P.M.

S.E.S.A. Special Session on Electrical Strain Gage Techniques—Open Forum for Discussion on Characteristics of Amplifiers, Characteristics of Galvanometers, Calibration Circuits, Methods of Recording, Use of Crystals in Stress Analysis and additional topics put forward by the audience.

"An Example of Electron Images in Million Volt Radiography," by Al Morris, American Industrial Radium and X-Ray Society, Hotel Hollenden.

3:30 P.M.

"The Three Functions of the Radiographic Interpreter," by Leslie W. Ball, American Industrial Radium and X-Ray Society, Hotel Hollenden.

Exhibitors at the Metal Congress

(Company name and booth number, Cleveland Public Auditorium)

A

Aber Engineering Works, Inc., Waterford, Wis. Booth H-627.

Acme Pattern & Tool Co., Dayton, Ohio. Booth K-615.

Acme Tool Co., Detroit. Booth H-620.

Aget-Detroit Co., Ann Arbor, Mich. Booth K-615.

Ajax Electrothermic Corp., Trenton, N. J. Booth C-340.

Aimes Engineering Co., Cleveland. Booth A-131.

Ajax Engineering Corp., Trenton, N. J. Booth C-340.

Ajax Electric Co., Inc., Philadelphia. Booth C-340.

Allen Mfg. Co., Hartford, Conn. Booth E-137.

Allison Co., Bridgeport, Conn. Booth D-315.

Alloy Casting Co., Champaign, Ill. Booth C-113.

Alloy Rods Co., York, Pa. Booth E-642.

Alox Corp., Niagara Falls, N. Y. Booth D-413.

Aluminum Co. of America, Pittsburgh. Booth A-621.

Aluminum Industries, Inc., Cincinnati. Booth A-413.

Alvey Ferguson Co., Cincinnati. Booth S-162.

American Brake Shoe Co., Chicago Heights. Booth B-122.

American Chain & Cable Co., Inc., Bridgeport, Conn. Booth D-321.

American Car & Foundry Co., New York. Booth A-318.

American Cyanamid & Chemical Co., New York. Booth H-601.

American Foundry Equipment Co., Mishawaka, Ind. Booth P-504.

American Gas Furnace Co., Elizabeth, N. J. Booth B-103.

American Machine & Metals Co., East Moline, Ill. Booth A-424.

American Machinist, New York. Booth B-111.

American Manganese Steel Div., American Brake Shoe & Foundry Co., Chicago Heights, Ill. Booth B-122.

American Metal Market, New York. Booth G-622.

American Photocopy Equipment, Chicago. Booth A-337.

American Porcelain Enameling Co., Muskegon, Mich. Booth C-428.

American Society for Metals, Cleveland. Booth S-116.

American Type Founders, Inc., Elizabeth, N. J. Booth G-633.

American Utilities Corp., Cleveland. Booth A-633.

Ampco Metals, Inc., Milwaukee. Booth D-130.

Anderson Bros. Mfg. Co., Rockford, Ill. Booth S-140.

F. E. Anderson Oil Co., Portland, Conn. Booth A-420.

Ansco, Div. of General Aniline & Film Corp., Binghamton, N. J. Booth C-203.

Armstrong Cork Co., Lancaster, Pa. Booth C-615.

Aro Equipment Corp., Bryan, Ohio. Booth I-624.

Automatic Temperature Control Co., Philadelphia. Booth P-513.

Automatic Transportation Co., Chicago. Booth A-409.

Automotive & Aviation Ind., Philadelphia. Booth G-623.

B

Babcock & Wilcox Co., New York. Booth C-133.

Bailey Meter Co., Cleveland. Booth I-640.

Baker & Co., Inc., Newark. Booth A-421.

Baker & Raulang Co., Cleveland. Booth K-603.

Baldwin Southwark Div. Baldwin Locomotive Works, Philadelphia. Booth B-605.

Barrett-Cravens Co., Chicago. Booth C-633.

Bastian-Blessing Co., Chicago. Booth P-512.

Bausch & Lomb Optical Co., Rochester, N. Y. Booth C-607.

Bell & Gossett Co., Morton Grove, Ill. Booth D-618.

Bellis Heat Treating Co., Branford, Conn. Booth H-604.

Bellows Co., Akron, Ohio. Booth D-311.

Bison Forge Co., Buffalo. Booth F-606.

Black Drill Co., Cleveland. Booth D-146.

Bradley Washfountain Co., Milwaukee. Booth C-625.

Brickseal Refractory Co., Hoboken, N. J. Booth F-611.

Bridgeport Brass Co., Bridgeport, Conn. Booth A-315.

Briggs Manufacturing Co., Cleveland. Booth D-640.

Bristol Co., Waterbury, Conn. Booth B-614.

Brown Instrument Co., Philadelphia. Booth F-601.

Brush Development Co., Cleveland. Booth E-619.

Budd Induction Heating, Inc., Detroit. Booth D-320.

Buehler Ltd., Chicago. Booth E-133.

Burdett Mfg. Co., Chicago. Booth D-601.

Burgess Battery Co., Chicago. Booth A-121.

By-Products Steel Corp., Coatesville, Pa. Booth B-110.

C

Cadillac Gage Co., Detroit. Booth A-141.

Andrew C. Campbell Div., American Chain & Cable Co., Bridgeport, Conn. Booth D-621.

Canadian Radium & Uranium Corp., New York. Booth C-628.

Carboloy Co., Inc., Detroit. Booth E-604.

Carpenter Steel Co., Reading, Pa. Booth D-102.

Central Scientific Co., Chicago. Booth P-523.

Chemical Rubber Co., Cleveland. Booth A-310.

Cherry Rivet Co., Los Angeles. Booth C-242.

Chicago Flexible Shaft Co., Chicago. Booth A-410.

Chicago Specialty Welding Co., Chicago. Booth P-502.
Chicago Steel Foundry Co., Chicago. Booth L-302.
Cities Service Oil Co., New York. Booth F-629.
Clark Instrument, Inc., Dearborn, Mich. Booth C-233.
Clark Truc-tractor Div. of Clark Equipment Co., Battle Creek, Mich. Booth C-221.
Robert H. Clark Co., Los Angeles. Booth K-617.
Cleveland Chamber of Commerce, Cleveland. Booth G-640.
Cleveland Duplex Machinery Co., Cleveland. Booth B-215.
Cleveland Ordnance Dist. Booth K-623 to K-643.
Cleveland Pneumatic Tool Co., Cleveland. Booth G-620.
Cleveland Tapping Machine Co., Cleveland. Booth B-603.
Climax Molybdenum Company, New York. Booth D-425.
Coffing Hoist Co., Danville, Ill. Booth C-424.
Commerce Pattern Foundry & Machine, Detroit. Booth I-625.
Connover-Mast Corp., New York. Booth D-629.
Continental Industrial Engineers, Chicago. Booth D-424.
Continental Machines, Inc., Minneapolis. Booth B-320.
Crescent Machine Co., Leetonia, Ohio. Booth C-409.
Crown Rheostat & Supply Co., Chicago. Booth C-428.
Crozier Machine Tool Co., Hawthorne, Cal. Booth K-611.

D

Darwin & Milner, Inc., Cleveland. Booth A-429.
Dearborn Chemical Co., Chicago. Booth I-632.
De Burr Barrel Co., Cleveland. Booth K-616.
Deepfreeze Div. Motor Products, North Chicago, Ill. Booth A-402.
Delaware Tool Steel Corp., Wilmington. Booth A-325.
Dempsey Industrial Furnace Corp., Springfield, Mass. Booth E-613.
Dennison Engineering Co., Columbus. Booth P-500.
A. P. De Sanno & Son., Inc., Phoenixville, Pa. Booth B-135.
Despatch Oven Co., Minneapolis. Booth C-326.
Detroit Stamping Company, Detroit. Booth B-420.
Detroit Surfacing Machine Co., Detroit. Booth A-620.
Detroit Testing Machine Co., Detroit. Booth C-617.
De Walt Products Corp., Lancaster, Pa. Booth B-310.
Diamond Tool Co., Los Angeles. Booth C-208.
Die Casting, Cleveland. Booth F-630.
Dietert Company, Harry W., Detroit. Booth D-110.
Dillon & Co., W. C., Chicago. Booth C-629.
Diversey Corp., Chicago. Booth A-624.
Divine Bros., Utica, N. Y. Booth F-633.
Dravo Co., Pittsburgh. Booth C-638.
Do-All Cleveland Co., Cleveland. Booth B-320.
Dow Chemical Co., Midland, Mich. Booth B-315.
Dow Chemical Co. Plastic Div., Midland, Mich. Booth E-108.
Drop Forging Assoc., Cleveland. Booth D-633.
Ductile Chrome Process Co., Detroit. Booth H-608.
Allen B. Du Mont Labs., Inc., Passaic, N. J. Booth D-605.
E. I. du Pont de Nemours & Co., Wilmington, Del. Booth C-110.
Joseph Dyson Sons, Inc., Cleveland. Booth F-604.

E

East Shore Machine Products Co., Cleveland. Booth A-627.
Eastern Smelting & Refining Corp., Boston. Booth B-426.
Eastman Kodak Co., Rochester, N. Y. Booth F-617.
Ecco High Frequency Corp., North Bergen, N. J. Booth C-624.
Eclipse Fuel Engineering Co., Rockford, Ill. Booth G-601.
Elastic Stop Nut Corp. of America, Newark, N. J. Booth A-321.
Electric Furnace Co., Salem, Ohio. Booth S-106.
Electric Production Magazine, Cleveland. Booth S-124.
Electro-Alloys Co., Elyria, Ohio. Booth B-122.
Electro Etch Co., Cleveland. Booth S-130.
Elwell-Parker Electric Co., Cleveland. Booth C-421.
Engineering Spec. Div. Universal Engravers, Cleveland. Booth C-429.
Erickson Steel Co., Cleveland. Booth D-403.
Eutectic Welding Alloys Co., New York. Booth D-306.
Executone Systems, Cleveland. Booth F-613.
Elgin Watch Co., Elgin, Ill. Booth A-212.

F

Fansteel Metallurgical Corp., North Chicago, Ill. Booth P-522.
Fawick Airflex Co., Cleveland. Booth C-207.
Federal Products Corp., Providence. Booth P-520.
Federal Telephone & Radio Corp., Newark, N. J. Booth P-525.
Ferrotherm Co., Cleveland. Booth C-230.
Finnell System, Inc., Elkhart, Ind. Booth A-427.
Firth Sterling Steel Co., McKeesport, Pa. Booth B-146.
Fitzsimmons Steel Co., Hammond, Ind. Booth G-642.
Floquil Products, Inc., New York. Booth F-608.
Flynn Mfg. Co., Detroit. Booth F-120.
Forest City Foundries Co., Cleveland. Booth A-626.
The Foundry, Cleveland. Booth E-146.
Fostoria Industrial Service. Booth S-120.
Foxboro Co., Foxboro, Mass. Booth B-114.
Fox Grinders, Inc., Pittsburgh. Booth A-218.
Frontier Bronze Corp., Niagara Falls, N. Y. Booth B-428.
Fulton Foundry & Machine Co., New Rochelle, N. Y. Booth D-621.
Furkert Co., E. A., Chicago. Booth C-225.

G

Gamma Instrument Co., Inc., New York. Booth D-624.
Gas Appliance Service, Inc., Chicago. Booth C-225.
Gas Machinery Co., Cleveland. Booth F-110.
General Alloys Co., Boston. Booth C-146.
General Electric Co., Schenectady. Booth G-604.
General Electric X-Ray Corp., Chicago. Booth C-122.
Globe Machine & Stamping Co., Cleveland. Booth C-408.
Gordon Co., Claud S., Chicago. Booth C-617.
Graham Rotary File & Tool Co., New York. Booth B-412.
Gray-Mills Co., Evanston, Ill. Booth A-416.
Gulf Oil Corp., Pittsburgh. Booth A-331.

H

H & H Research Co., Detroit. Booth A-620.
Hamilton Kent Mfg. Co., Kent, Ohio. Booth F-624.
Hammond Machinery Builders, Inc., Kalamazoo, Mich. Booth E-109.
Handy & Harman, New York. Booth E-140.
Harmon & Co., Chicago. Booth F-110.
H. M. Harper Co., Chicago. Booth I-628.
Hauck Mfg. Co., Brooklyn. Booth H-617.
Heil Engineering Co., Cleveland. Booth P-521.

Hercules Electric & Mfg. Co., Brooklyn. Booth H-605.
Hevi Duty Electric Co., Milwaukee. Booth D-142.
Hild Floor Machine Co., Chicago. Booth B-142.
Hitchcock Publishing Co., Chicago. Booth G-629.
Holcroft & Co., Detroit. Booth C-217.
A. F. Holden Co., New Haven, Conn. Booth B-147.
Holliday & Company, W. J., Hammond, Ind. Booth G-642.
Houghton & Company, E. F., Philadelphia. Booth C-130.
Howe & Son, Inc., Hinsdale, N. H. Booth C-232.

I

Ideal Commutator Dresser Co., Sycamore, Ill. Booth B-207.
Illinois Testing Labs., Inc., Chicago. Booth D-138.
Illinois Tool Works, Chicago. Booth C-310.
Independent Pneumatic Tool Co., Chicago. Booth C-611.
Indium Corp. of America, New York. Booth B-612.
Induction Heating Corp., New York. Booth D-340.
Industrial Bulletin, Chicago. Booth K-601.
Industrial Heating, Pittsburgh. Booth S-130.
Industrial Oven Engineering Co., Cleveland. Booth A-208.
Industrial Publishing Co., Cleveland. Booth F-630.
Industrial Tape Corp., New Brunswick, N. J. Booth C-218.
Industry & Welding, Cleveland. Booth F-628.
Instruments Specialties Co., Little Falls, N. J. Booth C-325.
Internal Surface Projector Co., Mineola, N. Y. Booth H-636.
International Nickel Co., New York. Booth S-136.
Iron Age, The, New York. Booth A-415.

J

Johns-Manville Sales Corp., New York. Booth K-610.
Johnson & Son, Inc., S. C., Racine, Wis. Booth G-612.
Jones Co., C. Walker, Philadelphia. Booth G-624.

K

Kelley Co., The J. W., Cleveland. Booth P-515.
Kelley-Koett Mfg. Co., Covington, Ky. Booth D-314.
Kennametal, Inc., Latrobe, Pa. Booth B-130.
Kent Co., Inc., Rome, N. Y. Booth F-625.
King, Andrew, Narberth, Pa. Booth B-138.
Knu-Vise, Inc., Detroit. Booth S-102.
Koch Sons, Inc., George, Evansville, Ind. Booth S-128.
Kold-Hold Mfg. Co., Lansing, Mich. Booth D-118.
Kolene Corp., Detroit. Booth H-629.
Krouse Testing Machine Co., Columbus, Ohio. Booth B-427.
Kux Machine Co., Chicago. Booth A-311.

L

Lakeside Steel Improvement Co., Cleveland. Booth E-122.
Lead Industries Association, New York. Booth P-507.
Leeds & Northrup Co., Philadelphia. Booth C-222.
Lapel High Frequency Laboratories, New York. Booth H-610.
Lester-Phoenix, Inc., Cleveland. Booth A-341.
Lewis Machine Co., Cleveland. Booth A-210.
Lewis-Shepard Products, Watertown, Mass. Booth B-421.
Light Metal Age, Chicago. Booth I-642.
Lindberg Engineering Co., Chicago. Booth C-150.
Lipe-Rollway Corp., Syracuse, N. Y. Booth B-219.
Lithium Co., Newark, N. J. Booth K-620.
Loma Machine Mfg. Co., New York. Booth H-605.
Los Angeles Chamber of Commerce. Booth A-630.
Lukens Steel Co., Coatesville, Pa. Booth B-110.
Lukenweld, Inc., Coatesville, Pa. Booth B-110.

M

Maas & Waldstein Co., Newark, N. J. Booth C-209.
Machine Design, Cleveland. Booth E-146.
Machine Tool Blue Book, Chicago. Booth G-629.
Machinery, New York City. Booth E-141.
Machinery Mfg. Co., Los Angeles. Booth C-234.
Magniflux Corp., Chicago. Booth E-621.
Magnetic Analysis Corp., Long Island City, N. Y. Booth C-415.
Mahr Mfg. Co., Minneapolis. Booth B-134.
Malleable Founders Society, Cleveland. Booth F-130.
Mallory & Co., P. R., Indianapolis. Booth E-601.
Martin Co., Glenn L., Baltimore. Booth C-216.
Martindale Electric Co., Cleveland. Booth D-235.
McDill, Rex D., South Euclid, Ohio. Booth F-623.
Meehanite Research Institute, New Rochelle, N. Y. Booth D-621.
Mercury Products Co., Cleveland. Booth A-425.
Metal Finishing, New York. Booth C-139.
Metal Finishing Service, Chicago. Booth C-214.
Metal Industries Catalog, New York. Booth D-431.
Metallizing Co. of America, Chicago. Booth I-619.
Metallizing Engineering Co., Long Island City, N. Y. Booth H-624.
Metal Progress, Cleveland. Booth S-116.
Metallurgical Laboratories, Inc., Philadelphia. Booth C-141.
Metals Review, Cleveland. Booth S-116.
Metals and Alloys, New York. Booth D-431.
Michiana Products Corp., Michigan City, Ind. Booth B-131.
Michigan Steel Casting Co., Detroit.
Fabricated Prod. Div. Booth C-226.
Alloy Casting Div. Booth P-519.
Precision Casting Div. Booth H-628.
Microfilm Corp., Cleveland. Booth F-610.
Mid-Continent Metal Products Co., Chicago. Booth E-609.
Midland Paint & Varnish Co., Cleveland. Booth B-210.
Mill & Factory, New York. Booth D-629.
Mine Safety Appliances Co., Pittsburgh. Booth C-142.
Minneapolis-Honeywell Regulator Co., Minneapolis. Booth F-601.
Minnesota Mining & Mfg. Co., St. Paul. Booth A-605.
Molybdenum Corp. of America, Pittsburgh. Booth D-137.
Monarch Steel Co., Hammond, Ind. Booth G-642.
Morrison Engineering Co., Cleveland. Booth 404.
Morrow Mfg. Co., Wellston, Ohio. Booth S-150.
Motch & Merryweather Machinery, Cleveland. Booth C-621.

N

National Bronze & Aluminum Foundry Co., Cleveland. Booth P-501.
National Engineering Co., Chicago. Booth D-133.
National Industrial Publishing Co., Pittsburgh. Booth S-134.
Nelson Specialty Welding Equipment Corp., San Leandro, Cal. Booth P-502.
New Equipment Digest, Cleveland. Booth E-146.
Niagara Blower Co., New York. Booth P-518.
Nichols Morris Corp., New York. Booth B-215.
Nitralloy Corp., New York. Booth B-222.

(CONTINUED ON PAGE 160)

AISE Discusses New Designs And Operations

o o o

. . . The report of the 40th annual meeting of the American Iron and Steel Engineers held recently in Pittsburgh is concluded with additional data on Republic's sintering units and a review of the symposium on the cleaning of steel for subsequent coating.

(CONTINUED FROM PAGE 73, THE IRON AGE, OCTOBER 5)

In designing sintering plants in connection with blast furnace plants, careful consideration should be given to the amount of flue dust that will be produced. Of course, this depends upon the number of blast furnaces in the location. In addition to flue dust, consideration should also be given to sintering fine ores. The flue dust usually contains excess carbon in the form of fine coke, and this excess carbon is ideal for sintering fine ores which will give the operator a means of balancing carbon content in the feed to the sintering machine, thereby securing uniformity of product. The percentage of ore added to the mix to balance the excess carbon in the flue dust increases the tonnage output by the percentage of ore added over the tonnage that could be made by flue dust alone.

All blast furnace plants usually have quantities of fine ore of which a good percentage will flow out as flue dust if charged into the furance. Therefore, some of this ore should be made available for processing in the sintering plant.

The handling of blast furnace sludge, which accounts for 30 to 50 per cent of the flue dust produced, should be given careful consideration. Sludge is not a desirable sintering material as it is very fine and has a high moisture content but, if properly handled, can be added to the other sintering component materials without difficulty. The usual methods of recovery are through underflow thickeners or settling basins. At some plants the sludge is pumped to a filter where a filter cake of uniform moisture content is produced. The filter should be located at the sintering plant where the filter cake may be discharged directly onto a conveyor carrying the mixture to be sintered. Filter cake handled in cars presents many handling problems through track hoppers, chutes, bins, etc. Sludge taken to the ore yard where it is mixed with flue dust or ore produces a very unsatisfactory material for the sintering plant due to the variations in carbon and moisture.

At the Warren plant, ore or flue dust to be sintered is loaded into the ore larry car by the ore bridge, and the larry car then deposits the material into one of four track hoppers, each having a capacity of 2035 cu. ft. Each track hopper has two syntron electronic bin feeders that dump onto a belt conveyor that is common for all eight feeders. This track hopper conveyor is a 30 in. wide belt running 236 ft. per min. and is approximately 40 ft. long.

From the track hopper conveyor, the materials are delivered to the sintering plant on two inclined belt conveyors to a point in the sintering building 78 ft. 5 in. above yard level.

The sintering machine is a continuous pallet conveyor and 72 in. wide and 89 ft. 1½ in. long from center line of drive shaft to center line of the discharge end radius, having an adjustable speed from 40.8 in. to 122.4 in. per min. The pallets and pallet frames are made of steel castings and are supported on forged steel track wheels equipped with roller bearings, closures and alemite lubricating fittings. The entire conveyor is well sealed. Careful consideration was given to the design of the entire machine to insure proper lubrication and sealing.

Underneath the sintering machine there are 12 cast iron wind boxes. The wind boxes are connected to a rectangular suction main that is 7 ft. x 2 ft. 7⅛ in. high at the discharge end and increases to 9 ft. high at the drive end of the machine. The suction main under the machine is equipped with six dust hoppers, which have counterweighted gates on the hopper discharge pipes. When sufficient dust accumulates in the hopper, the weight of the dust opens the gate and the dust is discharged onto belt conveyor. Ahead of the main dust catcher there are three more openings in the suction main that also discharges directly onto this conveyor.

The sintering fan is connected to the discharge of the dust catcher by a 6 ft. i.d. pipe. The fan is a double inlet type, rated capacity 100,000 cu. ft. per min., at 24 in. static pressure, made of steel plate construction for 250 deg. F., equipped with roller bearings and water cooled bearing housings, and is driven by a 600 hp., 720 revolutions per minute, 2300 volt, 60 cycle, 3 phase synchronous motor with an exciter.

As previously mentioned, all the dust from the dust catching hoppers is automatically discharged onto the last conveyor, which in turn discharges onto the conveyor carrying the raw material to the sintering machine, and in this manner the dust is returned to the sintering machine.

The successful operation of the sintering machine depends upon the proper design of the ignition furnace which ignites the bed of material to be sintered and the proper suction of the sintering fan for maintaining combustion until the sintering operation is completed. Ignition furnaces have been made in the past with a spread of about 12 in. on the bed, and the fur-

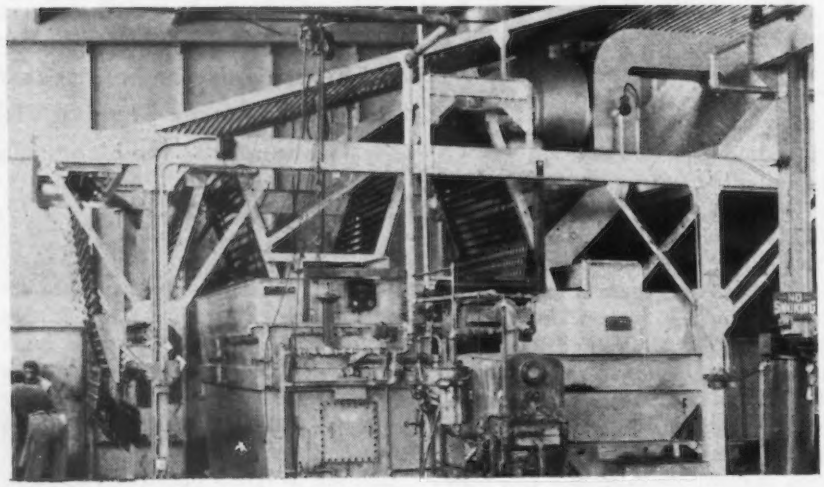
(CONTINUED ON PAGE 170)

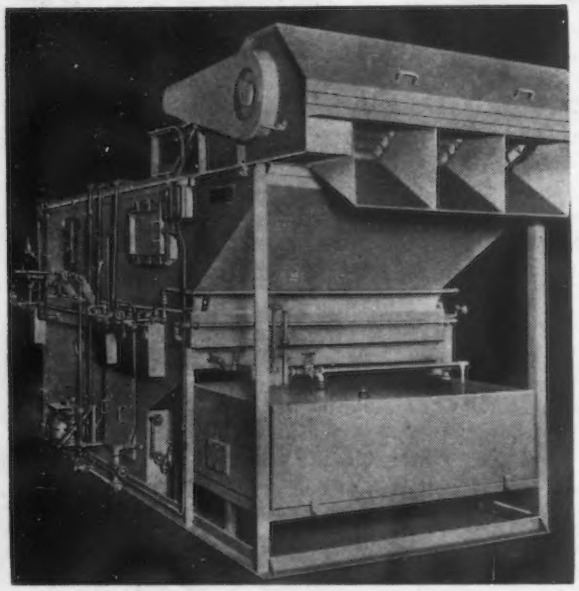
New Equipment . . .

Finishing

. . . Recent developments in degreasing and cleaning equipment, plating accessories, metal coatings and other finishes are described in the following pages.

TO facilitate the changeover in cleaning setups, the *Detrex Corp.*, Detroit 27, has in many cases designed its degreasers and washers to serve both wartime and peacetime applications with a minimum of rebuilding. Design of the machine illustrated, for example, was so coordinated as to enable the manufacturer, whose business was in small automotive accessories, to install the machine for production cleaning of ammunition clips. No change whatever in construction of this degreaser will be necessary when the time for conversion arrives. The degreaser has three divisions which permit cleaning of assorted types and sizes of parts.





Automatic Finishing System

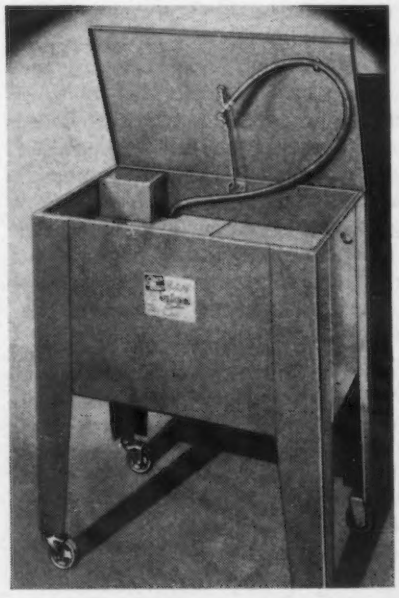
AN automatic finishing system for painting the steel landing mat sections used in building emergency airfields which is said to be immediately adaptable without construction change for peacetime production of farm implements, metal lath, prefabricated housing units, steel specialties, etc., has been developed by *Industrial Oven Engineering Co.*, 11621 Detroit Avenue, Cleveland. The machine consists of a continuous crossbar conveyor which carries the parts through the various processes, a vapor degreaser, an agitated dip tank and a three-zone oven which dries, bakes and cools the mats continuously. Conveyors now in use are 8 ft. wide and will carry parts up to 750 lb. in weight.

Paint Reclaiming Agent

A MATERIAL known as Traversite for promoting safety and economy in the finishing departments of industrial plants where the waterfall type of paint booth is employed is being marketed by the *Penetone Co.*, Tenafly, N. J. This paint reclaiming agent is said to be a highly concentrated, extremely potent but entirely harmless powder which, when introduced into the circulating water at the rear of the booth, prevents the overspray from fouling the flood sheets, nozzles and circulating system and also protects the metal back-set from corrosion and rust. Surplus paint is caught by the falling water at the rear of the booth and accumulates in the water reservoir, from which much of it may be reclaimed.

Parts Cleaning System

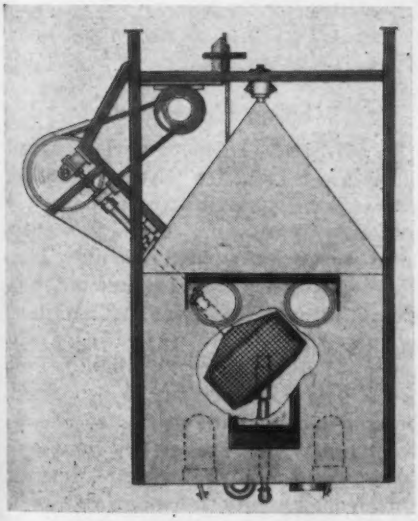
A PARTS cleaning system, combining the utility of two washers in one self-contained portable unit, has been announced by *Gray-Mills Co.*, Evanston, Ill. The system includes a portable cleaner with a "Swisher" feature and cold-cleaning Flo-Bac solvent. Large parts, requiring individual handling, are cleaned



of grease and grime by a strong stream of solvent pumped from the tank below. The smaller parts can be washed in quantity by merely pouring them into a basket and immersing them in solvent. By removing a two-section shelf, access is obtained to the dipping tank below. Two models are available, P70 illustrated, and a smaller model, P60.

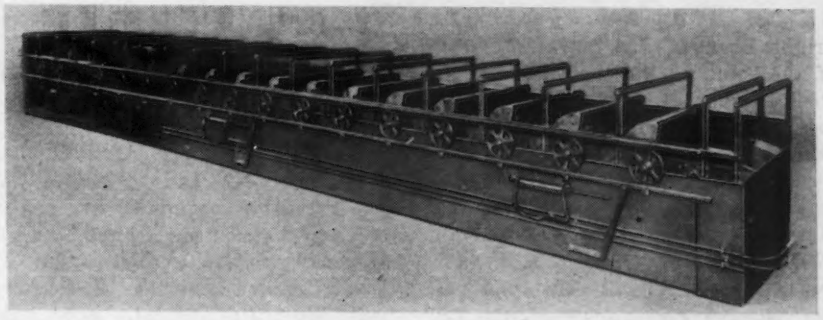
Sandblasting Unit

A SANDBLAST for removing scale and casting sand has been developed by *Leiman Bros, Inc.*, 144-76 Chrystie Street, Newark 5, N. J. The unit is a combination of the sandblast cabinet with stationary nozzle and the rotating basket or tumbling barrel type. The latter is fitted inside the cabinet in such a way as to make it available for sandblasting quantities of small articles such as nuts, screws and small gadgets of all types. The rotating basket is filled and the machine sandblasts the articles automatically as they are tumbled over and over. When the basket is removed from the cabinet, the larger available space inside may be used to sandblast pieces of work of larger dimensions. The basket is motor driven at the proper speed to make the sandblasting spray fully effective. The sand is fed through the nozzle over and over again from a reservoir at the bottom of the cabinet.



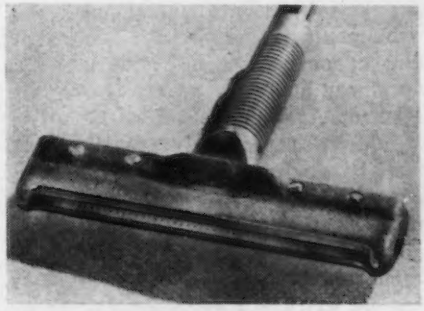
Polishing Wheel Bushings

STEEL bushings for polishing wheels have been announced by the *Manderscheid Co.*, 605 West Washington Boulevard, Chicago 6. Presto steel bushings are said to aid in the quick and easy changing of wheels without wear to the spindle and without risk to the operator. The bushings are pressed into the wheel using a polishing lathe spindle. The wheel is kept concentric regardless of how often removed, thereby assuring uniform contact all around the wheel. Notches hold the bushings in the wheel and prevent turning.



Flame Priming and Descaling Nozzles

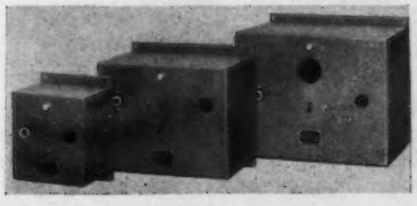
TO remove rust scales from steel plate and prepare it for painting, the Victor standard descaling attachment has been announced by



Victor Equipment Co., 844-854 Folsom Street, San Francisco. A feature of the flame priming and descaling nozzle is the spiral mixer and proportioner which handles the larger gas volumes required for these operations and assures freedom from back-fire and flash-back. An Airadiator at the nozzle head keeps pre-mixed gases below ignition temperatures even within the proximity of the ribbon flame and deflected heat. Replaceable Meehanite skid shoes with properly shaped lug are said to add to the wearing life of the nozzle and to allow it to be dragged at any suitable angle over the metal surfaces to be cleaned. The nozzles are furnished separately or with the Victor torch butt.

Rectifier Unit

SELENIUM rectifier power supply units of 1, 5 and 10 amp. at 115 volt, d.c., designed for use in the oper-



ation of magnetic equipment, d.c. motors, relays, circuit breakers, electro plating baths, battery chargers and other applications are being manufactured by *Federal Telephone and Radio Corp.*, Newark, N. J. Designed for wall or bench mounting with no special connections needed, the units are equipped with a 6 ft. input lead with male connector and a standard convenience receptacle for the output. The 10 amp. unit is furnished with an 11 point selector switch for maintaining 115 volt from no load to full load.

Metal Stripping Bath

A UNICHROME alkaline stripping bath that eliminates the need for critical chemicals in metal stripping has been announced by *United Chromium, Inc.*, 51 East 42nd Street, New York 17. It removes copper, chromium, cadmium, zinc, tin and other electrodeposited metals from steel and cast iron but will not etch or pit the base metal. The bath is made up by dissolving 2 lb. of Unichrome strip salt in water and adjusting the pH. Stripping is then ready to start. Moderate operating temperatures, from 80 to 180 deg. F. involve fewer heat losses. Current densities range from 100 to 175 amp. per sq. ft. Recommended equipment consists of an unlined steel tank with a plain steel heating coil together with facilities for rinsing. Ordinary steel or copper electrodes are used, depending on the metal to be stripped. The solution is non-toxic and non-corrosive. Since the solution is only mildly alkaline, it is less severe on rack coatings and stop-off materials than high strength solutions operated at high temperatures.

Zinc Stripper

AN alkaline stripper called Enthone zinc stripper for the rapid removal of zinc plate has been developed by *Enthone Co.*, 469 Elm Street, New Haven, Conn. This new product which quickly strips zinc plated coatings of all types and thicknesses of the order of 0.001 in. will strip in 30

sec. leaving the metal clean and bright. Because of the alkaline nature of the solution, the tendency for the steel to rust after stripping is said to be largely removed. Effective for removing zinc coatings that have been treated with various chromate processes and for all types of bright zinc plates, the stripper is supplied as salts which are added to water in the concentration range of 2 to 3 lb. per gal. and the mixture is heated from 200 to 215 deg. F. Plain steel tanks and heating coils are used.

Stop-Off Lacquer

AN improved stop-off lacquer, Miccrome, specifically developed for masking of parts for hard chrome plating is announced by *Michigan Chrome and Chemical Co.*, 6340 East Jefferson Avenue, Detroit. It can be applied easily by brushing, dipping or spraying and provides a smoother and more even coating than Micro stop-off lacquer HB-401 and HR-302. It offers fast air drying qualities and requires no force drying. After plating, Miccrome can be easily peeled or dissolved. It can be removed from hard-to-reach spots by hot soaking for a short interval and then blowing the remaining material off by the use of compresed air. This material is said to have excellent dielectric strength which provides accurate control of deposit and a minimum of current lost.

Water Purifier

A PROCESS for the purification of water to replace distilled water has been developed by the Illinois Water Treatment Co. It is said this process will produce "de-ionized" water fit for any chemical or industrial purpose, particularly for electroplating. The *Hanson-Van Winkle-Munning Co.*, Matawan, N. J., has been appointed sales representative for this process in the metal finishing industry.

Water Analysis Apparatus

FOR the determination of hardness, calcium and magnesium in waters both industrial and potable, the Aero-Titrater has been developed by *Chief Chemical Corp.*, 1123 Broadway, New York 10. It is also widely applicable to water problems in the process industries. False endpoints are absent and air agitation eliminates shaking by hand. The apparatus uses a new endpoint based on the foam-meter principle. Determinations are made within 10 min. and there is no waiting time to observe stability of lather. Operation is said to be foolproof and gives identical results with different operators. The instrument is supplied calibrated and ready for assembly and use.

Metal Protective Coating

EQUIPMENT and processing for the dichromating of zinc coated steel and die cast parts have been developed by *Udylite Corp.*, 1651 E. Grand Blvd., Detroit 11. The equipment, illustrated, is fully automatic. Bulk parts are carried through a complete processing cycle by means of a split timed dwell schedule. Parts being processed are cleaned, rinsed, dipped, drained and dried continuously with no scratching or burring. The equipment is custom built to meet individual requirements.

Rust Inhibitor

A RUST preventive coating, known as Witco No. 673 rust inhibitor, for the protection of metal parts and equipment during storage, shipment and, in some cases, in service has been developed by *Witco Chemical Co.*, 295 Madison Avenue, New York 17. It is a cold-dip, rapid drying coating that may be applied either by dipping or spraying, as its viscosity is comparable to that of water. It is non-abrasive, non-corrosive and is easily removed with ordinary solvents. It has an extremely high melting point —in excess of 250 deg. F.—and yet the coating remains flexible at temperatures of 20 deg. below zero. It is packaged in standard 55 gal. steel drums.

Paint Stripper

A WATER-SOLUBLE, non-inflammable paint stripper that loosens paint for speedy removal with water has been developed by *Turco Products, Inc.*, 6135 Church Avenue, Los Angeles. Known as Turco Stripper L-780, it is claimed to be noncorrosive on metals. It is also said to be safe on wood with no tendency to cause warping. Applied with brush or spray, the material is left on the surface until it tests ready for removal (5 to 20 min.). Loosened paint is scrubbed with a water saturated brush to form a slurry. The slurry is then removed by hosing with water, steam or air and water gun. The stripper, being free rinsing, leaves a water break free surface.

Black Coating for Copper

FOR producing a stable, adherent, non-reactive cupric oxide black coating on copper alloys that gives high adhesion of lacquers, paints and enamels under severe weathering condition, *Enthone Co.*, Elm Street, New Haven, Conn., has announced its Ebonol "C" process. The inert nature of the Ebonol "C" coating prevents reaction between it and the organic finish. The catalytic nature of copper itself has been one of the causes for breakdown of the bond of organic coatings to copper alloys. The finish obtained is nap-like in nature presenting a relatively absorbent base for the paint to be anchored to. The process is suitable for treating copper alloys containing from 60 to 80 per cent copper. The lower copper alloys are colored a mahogany brown and alloys containing more than 65 per cent copper are colored black. Because of its dark color the Ebonol "C" finish, is not suitable as a base for clear lacquers or for one coating of white pigmented lacquer.

Vitreous Coating

SILCO, a sprayed-on, vitreous coating for ferrous metals, is inorganic in nature, resists acids, mild alkalis, rust, corrosion, heat, impact, abrasion, etc., and is a dull finish which may be buffed to a beautiful egg-shell gloss, according to *Mitchell-Bradford Chemical Co.*, 2446 Main Street, Bridgeport, Conn. Produced in black, white, Army drab and Navy gray, it is claimed that it withstands heat up to 1000 deg. F., and is not affected by a 200-hr. salt spray test. It is not flexible, although it will bend 30 deg. without breaking.

Filling Compound

A FILLING compound, designated as S-182, for lifting magnet cases, potting small transformers and general filling work has been developed by the *Sterling Varnish Co.*, Haysville, Pa. S-182 compound has great internal cohesion. The compound is supplied in two separate parts—S-182A, a viscous liquid, and S-182E of low viscosity which must be mixed immediately prior to use as they react slowly at room temperatures. However, the mixture retains sufficient liquidity for pouring for a period of 4 to 5 hr. At 60 to 70 deg. C., S-182 compound starts to set in about 1 hr. and becomes well dried overnight. When baked at 105-110 deg. C., it reaches its maximum hardness in 1 to 6 hr. depending upon the mass involved. S-182 compound has high dielectric strength, a low coefficient of expansion and is water resistant and oil proof. It will withstand temperatures up to 200 deg. C. without resoftening and does not become brittle at temperatures as low as 60 deg. C.

Let Trouble be our Introduction

THERE'S nothing like trouble to bring people together. That's why some of Revere's closest friends were gained through a mutual struggle against difficulties, troubles such as occasionally beset any business.

For an example, take the case of an important restricted war product. Rejections were running as high as 25%, due to trouble never before experienced with some of the material used in it. The manufacturer came in person to Revere, explained his difficulties, and asked if we could make any suggestions. We studied the matter in detail, and decided that a change in the traditional method of making the item might produce better results, but at a slightly higher cost. A special test run was made, and this proved to be completely successful. And, to our mutual delight, in the end the cost was not increased.

Revere, you see, has an open mind as well as an informed one, and is always ready to question the customary, find the answers to new problems. If something is worrying you in your employment of non-ferrous metals, get in touch with Revere, not for ready-made answers, but for wholehearted cooperation, a joint search for better results. This help is given freely, without obligation, of course. After all, we ought to know something about this business. We have been in it for 143 years.

* * *

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• Few more problems of postwar are potentially more explosive than the integration of veterans into industry . . . Many progressive firms have already taken steps.

DETROIT—This hotbed of unionism has no illusions about its postwar labor problems. Management and labor alike anticipate unchartered troubles of all sorts when the war ends. No small amount of thinking is being devoted today to those problems in the front offices.

Typical is the matter of employing discharged servicemen, who are already flowing back to the factories from the battlefields and the training camps in modestly increasing numbers. Right now there is no difficulty because every man who can work can find a job, even though Detroit's employment is some two per cent or so below its peak and is constantly diminishing. But when the war ends and today's trickling becomes a flood tide, the rights of the veterans may be pitted against the rights of home-front workers—many of whom fought in the last war. No thornier situation could be imagined.

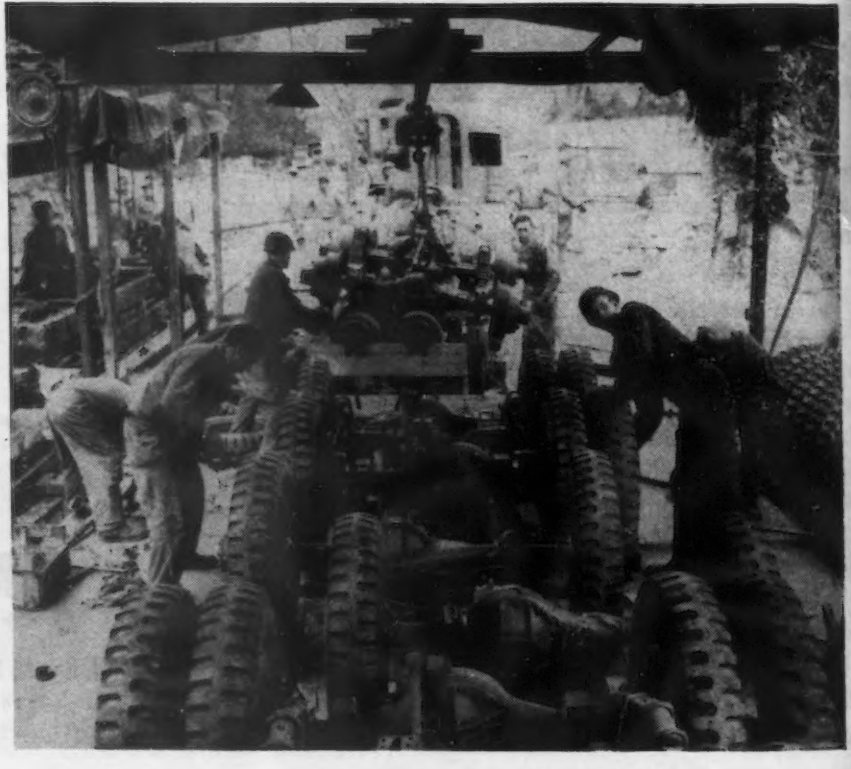
Companies feel that the unions have hoisted themselves high on their own petard. It was at union insistence that seniority provisions were inserted in most company agreements, and probably into the Selective Service Act of 1940 as well. Managers, consequently, will be able to make it clear that there is no choice offered them, that they must lean on the regulations. But the regulations, like the question of who has the right-of-way at a corner, are of poor consolation while the fragments of a collision are being swept up.

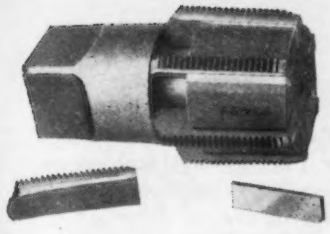
As matters stand today, many veterans enjoy definite advantages in job-seeking when they return home. They are entitled to reinstatement in a former position or one like it, even though such reinstatement makes necessary the discharge of a non-veteran with greater seniority. This is the essence of a selective service memorandum which evidently supersedes the language of the act, which calls for re-employment on the basis of simple seniority. Obviously if such policy is carried out industrial relations directors will carry their headaches around the clock with them; no matter which position or procedure is correct, or which interpretation they make, they will meet trouble head-on.

The peaches and cream position of the ex-serviceman created by current regulation interpretation may contain a little vinegar, however. Veterans who were probationary employees, or who were temporary help (which includes numbers hired to replace employees already gone into service) do not participate in the benefits of automatic re-employment. Nor do veterans who went to the services from school, without working histories behind them. It is obvious that as time goes on, the government may attempt to develop protective measures for those men not covered up to now, and most of such courses will inevitably make other worries for industrial relationists.

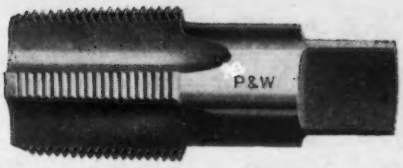
The CIO United Auto Workers Union has some counter-proposals of its own on this score. The UAW proposes that a veteran be ineligible to bump another employee in order to obtain a job, but urges that when he is finally hired, he receive seniority credit for his time in service. This policy would be applicable only in the first plant in which he obtains employment, and would apply without qualification as to probationary or temporary status before the war. It is quite admirable from the union executive standpoint, because it strad-

ARMY ORDNANCE AT WORK: *GI's and French civilians work on a vehicle assembly line at an Ordnance depot in Normandy, France. They are assembling 2-ton vehicles in this section.*

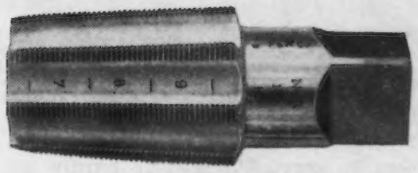




Inserted Chaser Taper Pipe Tap



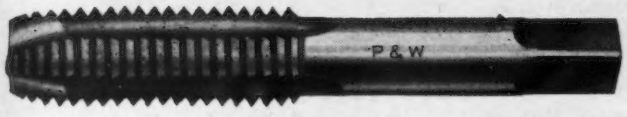
Taper Pipe Tap



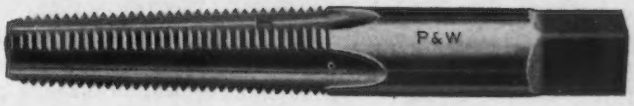
Mud or Washout Tap

Staybolt Tap

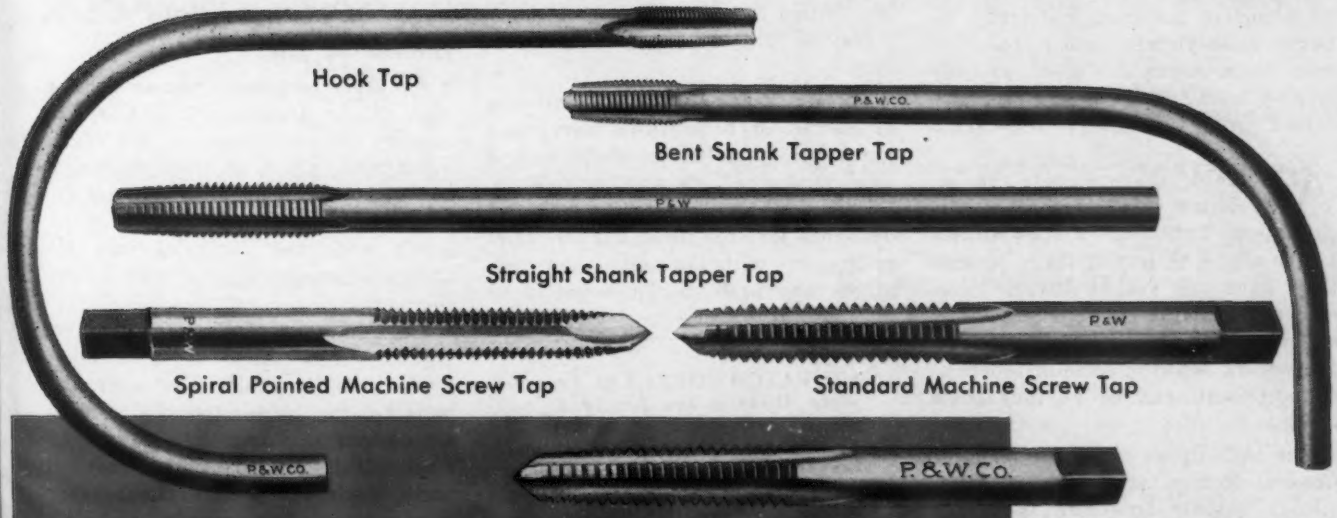
Pulley Tap



Spiral Pointed Hand Tap



Taper Boiler Tap



Hook Tap

Bent Shank Tapper Tap

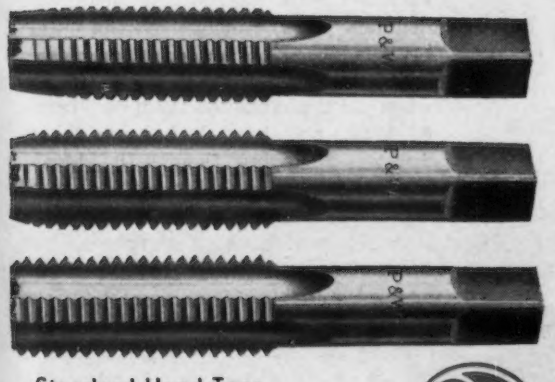
Straight Shank Tapper Tap

Spiral Pointed Machine Screw Tap

Standard Machine Screw Tap

Standard Hand Tap

A COMPLETE SERVICE ON TAPS



Standard Hand Taps

Pratt & Whitney taps include all kinds . . . the right one for any tapping operation regardless of material or the desired accuracy. Each one is a combination of proper design, top quality steel, scientific heat treatment and fine craftsmanship. For lowest cost per tapped hole . . . for trouble-free production . . . specify P&W taps.

Illustrations show a few of P&W's wide variety of taps. Ask for complete listings of sizes and prices.

PRATT & WHITNEY

Division Niles-Bement-Pond Company

WEST HARTFORD 1 • CONNECTICUT

dles the positions of the dues payers in the plants today, as well as the former members and potential members in service, but it is hardly an idea which managements can welcome warmly. It makes their every move suspect.

Automotive work, to illustrate, is seasonal. When the first layoff comes along a proportion of the force is laid off. Then, at rehiring time, veterans could flock in and get the available jobs. Employees would not be bumped to make room for the veterans, because they would already have been laid off when jobs were recreated by seasonal upturns. No matter how the union proposition is stated, some situation of this sort, provocative of ready misunderstanding, could arise. And each such one would stir up inherent disagreement among employees—one can see, much too clearly, the specter of a sort of jurisdictional strife between ex-servicemen and non-servicemen whose potential violence and bitterness would bode no good for sustained production nor for the nation.

ALL plant managements realize problems like these are approaching, but their shapes cannot yet be sensed by any of them, because they have not yet appeared. Some companies are taking steps of one sort or another which may build into a framework hoped in some instances to support contingencies as they come along.

The AC Spark Plug Division of General Motors, at Flint, has developed a notably humanized approach to re-employment of veterans. Any returned soldier is cordially welcomed. He is then interviewed by the employment manager, and a "coordinator of veteran service" talks with him and explains how the placement program helps him readjust to a job in industry. A medical examination and placement tests follow. Periodic checks are made by the coordinator to see that the veteran does the right type of work and is making a satisfactory adjustment.

International Harvester Co. also humanizes re-employment of veterans by seeing to it that each man is greeted by plant officials, his former supervisor, department associates and others before an employment interview takes place. Medical examination results in a coding of the man on the basis of work he is able to do despite handicap.

Ford Motor Co. takes every veteran with disabilities into the factory to look at the proposed job and talk it over with the foreman before a definite work assignment is made. To the employment records of all medically discharged veterans is attached a sticker marked "medical case" which makes it impossible to transfer a man to a different type of work without the approval of the medical transfer division.

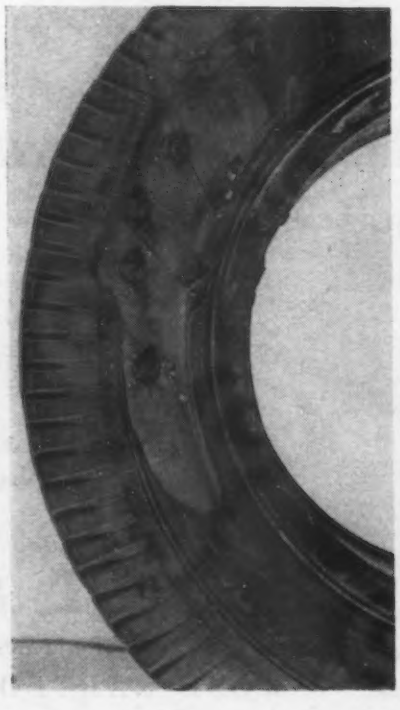
Cleveland Graphite Bronze Co. has developed a four-week conference course which was given to its first line supervisors to aid them in handling veterans. Legal aspects, procedure, the foreman's part of the job and other phases were discussed. This company takes a unique approach in setting up an ex-servicemen's club, purposes of which are to provide outlets for social energies, to furnish a medium through which men with common interests may exchange experiences, and to help make readjustment to civilian life. Veterans of other wars are also admitted to membership.

Hudson Motor Car Co. has installed a veteran of both world wars as a personnel specialist in placement of ex-servicemen. This man not only interviews returning veterans and recommends jobs for them, but also tries to iron out with the union shop committee any problems on seniority or other contract provisions which may arise.

Briggs Manufacturing Co. has also employed a full-time veterans' counselor, a man who was wounded in Tunisia. He follows up progress on jobs, recommends job transfers when advisable, and talks with returned veterans both in the plant and in their homes.

Budd Wheel Co. has earmarked a particular department in its Detroit plant for the exclusive employment of handicapped veterans, to be activated as soon as the plant returns to production of prewar items. In this department during normal times the department employs about 450 people, all seated at light, bench-work jobs.

NAZI PATCHWORK: *This French-made Michelin tire has been "repaired" by Nazis after Yank shells hit the field gun carriage it was supporting. Hard up for materials, the Nazis simply bolted a patch of rubber over the side walls.*



See Reverberations From Suit Against Defense Plant Corp.

Hammond, Ind.

• • • **Reverberations from** an aborted plan of the Defense Plant Corp. to convert two buildings at the Hammond, Ind., plant of Pullman-Standard Car Mfg. Corp. to aluminum extrusion production were felt here recently with the filing of suit for $500,000 damages against DPC by the company.

According to Pullman-Standard, DPC notified them in September, 1943, that it would take over the buildings for installation of aluminum extrusion facilities to be operated by Phelps-Dodge Corp. No agreement could be reached on a purchase or lease price, and this was left to be negotiated, but it was agreed that the buildings should be restored to their previous condition upon completion of the project, Pullman-Standard states.

On Dec. 1, 1943, the project was abandoned when it became evident that existing aluminum extrusion facilities were adequate to meet war demand. In the meantime, the buildings had been partially converted, according to Pullman-Standard, but when DPC abandoned them on March 6, 1944, no steps had been taken towards restoring them. In March, 1944, also, Army Ordnance filed condemnation proceedings to take possession for warehousing purposes, but these proceedings have not been pressed and therefore do not affect the present action, it is stated. The present suit, it is represented, constitutes an attempt to secure a settlement for the Defense Plant Corp. occupancy and failure to restore the buildings in accordance with the terms of the agreement.

A HIGH SCORE CAN MEAN GREATER ADVANTAGES *for your Postwar Products*

Test Yourself on these Questions about the Selection and Fabrication of Stainless Steels

The postwar designer will find many distinctive advantages in using Carpenter Stainless Steels in new or redesigned products. Whether he desires high strength/weight ratio for utility purposes, or extra beauty for eye-appealing consumer products, or special physicals for special jobs, these Stainless Steels can fill the bill—and do it at reduced costs.

Below, we have listed some of the questions which frequently arise in the discussion of Stainless Steel. Check your answers and compare them with those at the bottom of the page.

1 **For highly stressed structural parts, Stainless grades are readily available which provide good toughness, plus tensile strengths as high as:**

- ☐ A—400,000 lbs. per sq. in.
- ☐ B—200,000 lbs. per sq. in.
- ☐ C— 50,000 lbs. per sq. in.

2 **The maximum Rockwell hardness which can be obtained in any Stainless grade is:**

- ☐ A—C-60
- ☐ B—C-40
- ☐ C—C-30

3 **Selenium added to a Stainless alloy gives the steel:**

- ☐ A—Greater strength
- ☐ B—Ability to harden by heat treatment
- ☐ C—Easy-machining qualities

4 **Even when dead soft annealed, all Carpenter Stainless Steels run stronger and harder than soft low carbon steels by at least:**

- ☐ A—10%
- ☐ B—50%
- ☐ C—30%

5 **Which Stainless is recommended as providing greatest protection against intergranular breakdown at elevated temperatures:**

- ☐ A—Carpenter Stainless No. 4 (Type 302)
- ☐ B—Carpenter Stainless No. 4-Mo (Type 316)
- ☐ C—Carpenter Stainless No. 4-Cb (Type 347)

6 **Which of the following Stainless Steels can be hardened by heat treatment:**

- ☐ A—Carpenter Stainless No. 2 (Type 420)
- ☐ B—Carpenter Stainless No. 3 (Type 443)
- ☐ C—Carpenter Stainless No. 4 (Type 302)

7 **The corrosion resisting qualities of Stainless Steel will be impaired by:**

- ☐ A—Cold working
- ☐ B—Carburizing
- ☐ C—Immunizing

8 **In figuring the economy of using Stainless, a cubic inch of this metal will weigh less than the same volume of nickel or copper base nonferrous metals by about:**

- ☐ A— 4%
- ☐ B— 7%
- ☐ C—10%

The men responsible for the development of postwar products will find it to their advantage to have the correct answers to these and many other questions on Stainless Steels. Our 98-page book, "Working Data for Carpenter Stainless Steels", provides complete information about many Stainless Steels—tells how to use them to best advantage. For a copy, drop us a line on your company letterhead indicating your title.

CORRECT ANSWERS	
1. B	5. C
2. A	6. A
3. C	7. B
4. B	8. C

The Carpenter Steel Company • 121 W. Bern Street • Reading, Pa.

Carpenter STAINLESS STEELS ...for Strength, Rigidity, Heat Resistance, Corrosion Resistance, Longer Product Life, Sales Appeal

BRANCHES AT
Chicago, Cleveland, Detroit, Hartford, St. Louis, Indianapolis, New York, Philadelphia

Washington . . . L. W. MOFFETT

• Foreign trade battle raging under cover but Combined Boards' head denies such a fight exists . . . Other sources support belief that the controversy has reached a new high in "feuding".

WASHINGTON — One of the hottest, most important and bitterly contested feuds of the New Deal has been raging under cover in the past few months. The secret battle is about foreign trade and is being waged between the State Department on the one hand, the WPB Combined Raw Materials, Combined Production and Resources Boards and the Foreign Economic Administration on the other. Frederick M. Eaton, deputy administrator of the Combined Boards told THE IRON AGE that it is "absolutely untrue" that a feud is going on and that he would know about it if it were true.

Nevertheless other affected sources said that the issue is whether the United States shall conduct foreign trade through governmentally supervised cartels fostered by the Combined Boards, or whether the State Department shall approve all intergovernmental trade agreements, or whether cartels shall be totally banned and trade conducted on a strictly competitive basis by private companies.

Some State Department officials are accusing the Combined Boards of attempting to usurp the department's prerogatives by attempting to perpetuate themselves in the postwar period after having discharged their wartime duties of correlating United Nations' industries. Mr. Eaton said that the State Department has agreed upon the duration of the Combined Boards' tenure.

Charges have been made that the Combined Boards have made far-reaching postwar agreements, many of which are disadvantageous to the United States, and officials who are critical say that the agreements have been arrived at on a verbal basis so that none of the charges can be documented.

It is reported that the President's aide, Harry Hopkins, is on the side of the Combined Boards. Also siding with Hopkins is Oscar Cox, legal adviser to Leo Crowley, who heads up FEA.

While the Senate Foreign Relations Committee has been fully informed of the progress of the proceedings at Dumbarton Oaks, the same cannot be said of any trade agreements which may have come into existence through the Combined Boards.

The pattern of agreements supposedly entered into by the Combined Boards is to cut back war production of chemicals, non-ferrous metals, electrical equipment manufacturing plants and plants in the soft goods field, so that rationing will be enforced after the war. With allocation reinforced by a second step, the boards are said to favor the stockpiling of surplus materials and products, and thus stabilize world prices.

The Department of Justice, of course, which has frowned upon these agreements as being unlawful under the anti-trust laws, will be left out in the cold when formal agreements are entered into, if they are finally approved by Congress. Until that happens top justice attorneys will bang away, but it is suspected that they are tilting at windmills and trying to make themselves appear romantically important.

* * *

Senator Pat McCarran, Democrat of Nevada, came closer to the burlesque version of a Senator last week than any legislator has since Huey P. Long of Louisiana last trod the halls of Congress.

As chairman of the Senate Committee Investigating Industrial Centralization, the Senator proposed that government war plants in the 10 states of New York, Pennsylvania, New Jersey, Connecticut, Maryland, Delaware, Rhode Island, Ohio, Michigan and Illinois, be frozen.

This brought immediate condemnation by six governors of the New England states. Governor Saltonstall of Massachusetts said that the committee's findings were "Hitlerian and ridiculous" and represented "sectionalism gone mad."

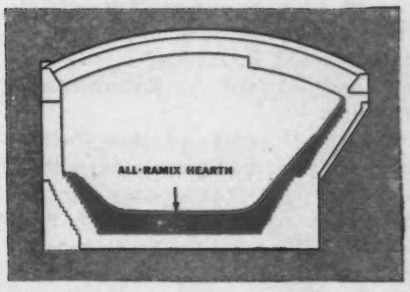
While Governor Saltonstall said that the plan if put into effect would mean the end of free enterprise if the government should try to control the geographical location of plants, Senator McCarran said that indus-

REAL RETRIEVER: *This is one of Baldwin Locomotive Work's M-3 tanks, 30 tons, with its turret off, carrying forward one of the American big guns in Italy. The armament at the front of the retriever is pure camouflage.*

RAMIX *paves the way*

for Greater Production of Top-Quality Steel

Installation of Ramix in the center section of the flat in a 100-ton open hearth furnace. Note that the workmen are ramming the Ramix behind wooden forms.



RAMIX continues to meet the steel industry's pressing need for a hearth refractory that can be installed in minimum time, for either new construction, furnace rebuilds, or major repairs.

Cold ramming of this high-magnesia refractory takes only a few hours, even in the largest open hearth furnaces, thus eliminating the slow, laborious burning in of the many layers of magnesite required in previous conventional hearth construction. This initial time saving, attributable to the use of Ramix, usually makes possible 10 to 15 or more *extra* heats of steel from a furnace—which means immediately 2000 to 3000 additional tons, or more, of steel tapped for war production needs.

Another valuable feature of Ramix—especially important in this period of dependance on inexperienced, untrained workers—is that hearths can be rammed by common, unskilled labor—under the supervision of Basic Refractories field engineers if you wish their assistance.

A completed Ramix hearth provides a clean, smooth, slag-resistant bottom, requiring a minimum of maintenance and repair. Delay time is reduced, furnace output per man-hour is increased, steel poured is cleaner, and quality is protected by Ramix hearths.

This is the experience of operators of more than 175 open-hearths, representing nearly 20% of basic open hearth steel capacity, and of 160-odd electric furnaces producing over 80% of America's electric steel. When YOU need a new hearth, use Ramix.

BASIC REFRACTORIES, INCORPORATED 845 HANNA BUILDING *Cleveland 15, Ohio*

trial centralization is "basically anti-capitalist."

Maps and graphs on a huge multi-colored chart which resembles a circus poster in its gaudy appeal accompanied the report. Other members of the committee are: Democrats, John Bankhead of Alabama, Guy M. Gillette of Iowa and Abe Murdock of Utah; Republicans, John Thomas of Idaho, Gerald P. Nye of North Dakota and Edward V. Robertson of Wyoming.

The report concluded that if war plants in the 10 states are permitted to reconvert, it "can destroy the industry in the rest of the country and reduce the West and the South to misery."

P. S. Senators McCarran, Gillette and Nye are running for re-election.

* * *

President Roosevelt signed the reconversion and demobilization bills with "reluctance." He declared the reconversion measure does not adequately deal with the human side of reconversion. He said that Congress had deleted provisions from the bill sponsored by the administration to prescribe Federalized standards to govern the amount and duration of unemployment compensation benefits.

Besides, the President said, Congress had killed the proposed program for providing transportation costs to return a migrant war worker and his family to their original home or to a new place of employment. He hoped that these "deficiencies" would be "rectified" promptly.

The President criticized the surplus property bill and said he doubted that the objectives of the bill could be accomplished because of its many provisions. He said that the confused methods of disposition and elaborate restrictions imposed by the bill will in many instances delay rather than expedite reconversion and re-employment.

After signing the measures, the President issued an executive order which transferred all records, property, funds and personnel of the Office of War Mobilization to the new Office of Mobilization and Reconversion and appointed James F. Byrnes director of the new three-man board. Mr. Byrnes, who was mobilization director, will serve in his new capacity until Congress reconvenes and names his successor.

Although Mr. Byrnes on the day following his appointment accepted the resignation of William L. Clayton as Surplus War Property Administrator, it is probable that the two men will leave the Government service at about the same time. Mr. Clayton, who opposed the creation of a board to dispose of surplus property, indicated that he will remain as long as Mr. Byrnes retains his post as War Mobilization and Reconversion Director.

Non-Ferrous Metals for Civilian Goods

Washington

• • • **WPB has authorized** the use of 321 tons of carbon steel, 4200 lb. of brass mill products, 750 lb. of copper base alloy foundry products and 1,513,479 lb. of aluminum for the manufacture of $26,055,000 of civilian goods up to Sept. 30, 1945, under the spot procedure contained in Priorities Regulation 25.

This information was disclosed in a report of the WPB Controller Division of Sept. 22 and covers only 108 authorizations.

Reports received from field offices indicate that a total of 1506 applications had been filed under the procedure through Sept. 14. On that date, 124 applications had been approved. Eighteen applications had been denied because of adverse WMC decisions, while 245 had been denied or rejected for other reasons. The remainder of the applications are still being processed.

The Controller Division report indicates that manufacture of 31 classifications of items has been authorized.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

YOU COULD THROW A MATTRESS DOWN THAT ONE GUY'S NECK, BUT NO--IT'S A POOR GOOF WHOSE COLLAR WOULD HARDLY LET A CRACKER CRUMB IN, WHO GETS TH' HOT CHIP DOWN HIS BACK!
WHAT KIND OF A WORLD DO YOU WANT TO LIVE IN? WE ALWAYS EXPECTED GRANDPAW'S BEARD TO KETCH FIRE SOME DAY, BUT HOW FAST HE COULD RUN AT 83 WAS TH' BIG KICK-- I LAUGH YET!
J.R.WILLIAMS 10-13
THE UNEXPECTED IS BEST
T. M. REG. U. S. PAT. OFF. COPR. 1944 BY NEA SERVICE, INC.

Nelson Resigns from WPB

Washington

• • • **Donald M. Nelson** resigned recently from the chairmanship of WPB to accept a roving economic ambassadorship, reporting directly to the president.

Mr. Nelson is expected to hold conversations with heads of allied countries with a view to formulating plans for the industrial reconstruction of war devastated areas.

In this role, Mr. Nelson will be a sort of super-salesman of machinery and industrial equipment and is expected to undertake to transmit to the president foreign needs for American engineering and other technical assistance.

Why the State Department, Lend-Lease, FEA and the Commerce Department representatives abroad are incapable of discharging this function remains unexplained.

SHEFFIELD MULTICHEKS

WILL HELP YOU BE COMPETITIVE

When you Convert!

★Millions of additional man-hours, many acres of floor space, and thousands of hard-to-get conventional gages would have been required in 1942-3 for the manufacture of war materials *if MULTICHEKS had not been available.*

Developed originally by Sheffield's research engineers to check projectiles, cartridge cases, fuses, and other ordnance components, MULTICHEKS are now being applied to countless other aircraft, automotive, and mechanical parts similar to those which will be produced in volume after the war.

From two to twenty dimensions, and in some cases even more, are being checked simultaneously in one quick, positive operation on the MULTICHEK. Red, green, and amber signal lights indicate whether each dimension is undersize, oversize, or within tolerance. The operator, however, normally watches only the Master Light, an exclusive Sheffield feature.

Tolerances in thousandths or ten-thousandths of an inch can be checked to an accuracy of ten-millionths. *The full manufacturing tolerance can always be utilized because no allowance for gage wear is necessary.* And the human element of error is entirely eliminated. This truly means faster inspection and fewer rejections. The initial and maintenance costs of conventional gages are reduced in proportion to the number of dimensions checked on the MULTICHEK.

Be competitive when you convert. Plan now to reduce your inspection costs with MULTICHEKS. Engineering quotations gladly made without obligation and in the strictest confidence. WIRE OR WRITE.

★More than ten million man-hours of gaging time were saved in 1943 by the hundreds of MULTICHEKS used in war production (assuming they were operated ONLY one shift per day).

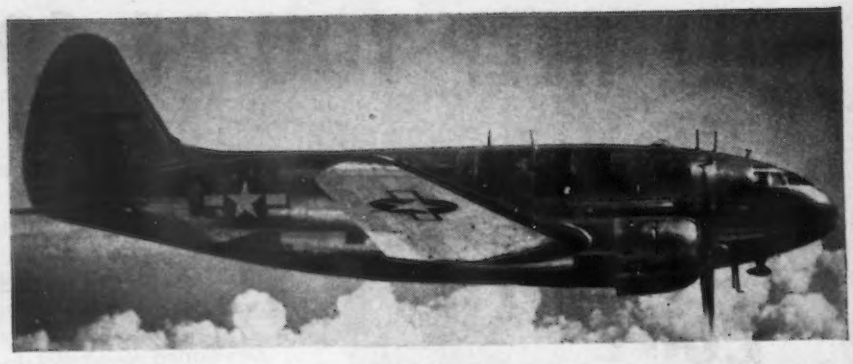
THE SHEFFIELD CORPORATION

Dayton 1, Ohio, U.S.A.

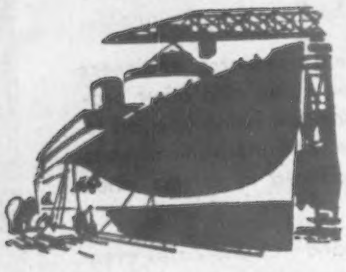
MACHINE TOOLS • GAGES • MEASURING INSTRUMENTS • CONTRACT SERVICES

WEST COAST . . . OSGOOD MURDOCK

• Intercoastal water shipments through Panama Canal likely to be resumed when European War ends, according to prominent steamship operating officials.



TRANSPORT: *U. S. Navy is using a new type transport vessel designated the APA, being built by Consolidated Steel Corporation's Wilmington, Calif., yard.*



SAN FRANCISCO—West Coast industry and trade is right on the threshold of resumption of intercoastal shipping, according to Charles L. Wheeler, executive vice-president of Pope & Talbot, Inc., and the McCormick Steamship Co. and recently retired president of Rotary International.

"With the termination of the European War," he told THE IRON AGE, "a great number of vessels should become immediately available. For instance, the reopening of the Dardanelles should release several hundred vessels. This may even take place before the termination of major hostilities. If this should be the case I see very little reason why at least 150 ships should not be diverted to intercoastal trade and the relief of our domestic traffic problem. This should apply to certain types of cargo particularly, including some of the heavy metals.

"Obstacles to such development are the consequent stepping-up of activity in the Pacific War theatre and present and future labor shortage and congestion in Coast ports. Use of outside docks and secondary terminal facilities might help to solve this problem."

Those on the ground familiar with the economics of postwar steel making west of the Rockies realize that the interplay of rail and coastal freight rates may be the deciding factor. Reopening of the Panama Canal even during wartime will enable Eastern Seaboard producers to lay down plates and shapes for Maritime and Navy ship construction a good deal cheaper than they are now being obtained from Geneva or Fontana.

Timely also was the presence on the Coast last week of W. M. Jeffers, president of the Union Pacific Railroad, and recent Rubber Czar, and his statement to the THE IRON AGE that:

"I should like to see the Geneva plant continue to operate," Mr. Jeffers said, and added, "the plant should stand or fall on its ability to compete, however." This may well be accepted as representing the official position of Union Pacific, a major factor to influence this plant's future.

"The Interstate Commerce Commission determines the railroad rates," Mr. Jeffers said, when asked about the possibility of a lowered rate for a private owner of Geneva. "It has the authority, and rightly so, to set a rate or to suspend a rate."

More fuel was added to the fire of West Coast interest in the Geneva mill's future when Edwin G. Nourse, vice-president of the Brookings Institution, expressed his belief that it would be "awfully bad national housekeeping to throw away your best piece of equipment. Surplus goods and productive capacity should be disposed of promptly," he said, "at prices which business can afford to pay. In many cases great ingenuity must be exercised to utilize them properly, but there is a real industrial future for the coast. Some of the more spectacular Pacific Coast industries are going to suffer a severe contraction and some will have to be converted to other lines of production." Regarding war and postwar decentralization, he believes some of the new regional plants are going to make the older, established firms get up and hustle.

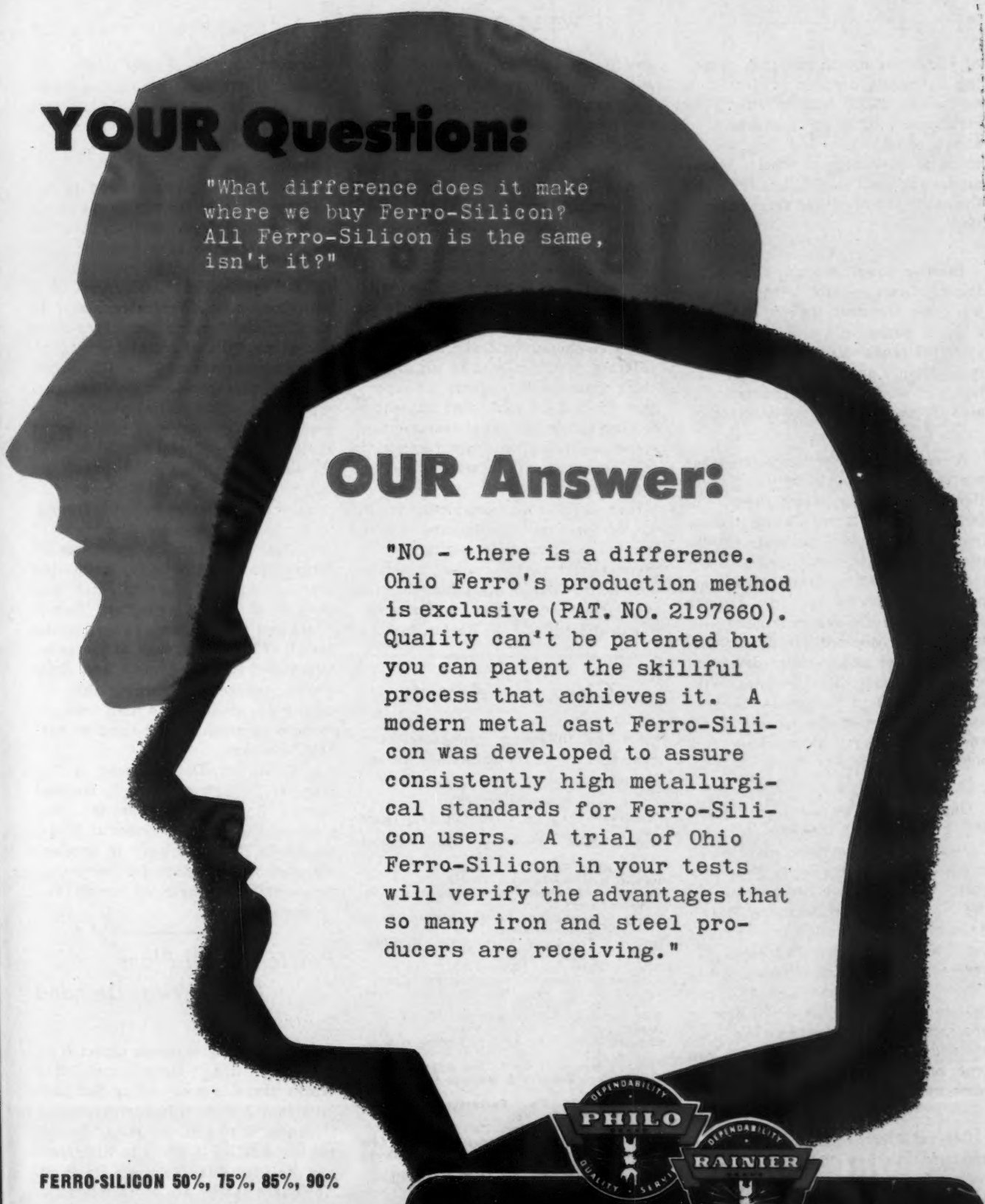
"As for prices and surplus properties," Mr. Nourse said, "peacetime workers must not be penalized by war work. With but a few exceptions, we can't afford to hold back on these things, we must liquidate them."

As to the major postwar problem, "It's going to be the job of management to accept the responsibility of finding jobs for 55 million people after the war. On how well it lives up to this responsibility depends whether or not business will find itself in or out of the saddle. There will be excess capacity after the war. The job is not going to be to create new capacity so much as it is to utilize the existing capacity wise . . . and to see that there is the purchasing power to take the product of this capacity off the market.

Occasion for this significant comment by prominent industrialists was an executives conference on public relations conducted by the National Industrial Information Committee and the National Association of Manufacturers at San Francisco headed by Charles E. Moore, president of Joshua Hendy Iron Works.

•

September plate production at Fontana was 27,000 tons, 2000 tons over the rated capacity of the mill and well up to expectations although not as high as the ambitious, restless, never-satisfied Kaiser organization hopes to go. Earlier in the year, it is understood the mill turned out 32,000 tons


YOUR Question:
"What difference does it make where we buy Ferro-Silicon? All Ferro-Silicon is the same, isn't it?"
OUR Answer:
"NO - there is a difference. Ohio Ferro's production method is exclusive (PAT. NO. 2197660). Quality can't be patented but you can patent the skillful process that achieves it. A modern metal cast Ferro-Silicon was developed to assure consistently high metallurgical standards for Ferro-Silicon users. A trial of Ohio Ferro-Silicon in your tests will verify the advantages that so many iron and steel producers are receiving."

FERRO-SILICON 50%, 75%, 85%, 90%

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BRIQUETS

SILICON, MANGANESE, CHROME

PHILO — DEPENDABILITY · QUALITY · SERVICE

RAINIER — DEPENDABILITY · QUALITY · SERVICE

Ohio Ferro-Alloys Corporation

Canton, Ohio

Chicago Detroit Pittsburgh San Francisco Tacoma

of plates one month and then operating difficulties dropped production to as low as 20,000 tons in July. The structural mill is reported operating ahead of schedule and on two full turns is producing channels, beams, angles and shell steel billets for Army Ordnance and Maritime ship construction.

•

Electric power consumption on the Pacific Coast turned downward last week for the first time in four and a half years. Observers attribute principal cause to the recent cutbacks in aluminum and light metal production and to change and conversion in aircraft and shipbuilding contracts.

•

A new $30,000,000 Navy Ordnance contract is announced by the Joshua Hendy Iron Works, which should materially aid that great Pacific postwar industrial prospect in bridging the gap. Its first wartime task was the manufacture of reciprocating steam propulsion machinery for Liberty ships. When the shipyard conversion to Victories occurred, Hendy converted to turbines and has also developed a line of marine diesel engines. With its main plant at Sunnyvale the company has some of the newest, finest and most diversified machine tool equipment in the Far West.

•

Once again 91 per cent of the 11,000 employees of Douglas Aircraft Co.'s Santa Monica home plant voted in an indecisive three-way stalemate union election under the auspices of the National Labor Relations Board. As bargaining agent 38 per cent voted for CIO United Auto Workers, 35.3 per cent for AFL International Association of Machinists, and 25.6 per cent for no union. There will now be another run-off between the two unions, since apparently over 70 per cent of those voting finally prefer some union bargaining agent.

•

General Electric has announced negotiations to buy 12 acres at Anaheim, Orange County, near Santa Ana and 50 miles southeast of Los Angeles, where plastic parts for airplanes are to be manufactured after the war. This supplements the recent purchase by G.E. of a postwar factory site at San Jose, 50 miles south of San Francisco.

* * *

LOS ANGELES — World-cruising airplanes, smaller than ocean liners but just as luxurious in appointments and passenger comforts, were predicted as postwar possibilities before SAE National Aeronautic Meeting here by Henry Dryfuss, industrial designer of New York.

"Planes will be used not only for fast travel over land and sea but also for reasonably leisurely cruises—a couple of weeks around the world, with side excursions by helicopter into obscure places previously off the beaten track," Mr. Dryfuss said. Insisting that passengers should not be packed into airplanes, and that plane interiors should be designed to meet differing requirements, he urged that plane operators learn from the experience of land carriers that passenger comfort pays and that comfortable accommodations, not only for sitting or sleeping, but for walking about, should be provided.

That wartime high production methods of airplane manufacture can be adapted to peacetime production of commercial transport planes to make them safe, fast, comfortable, cheaper to operate, and easier to maintain, was promised by J. N. Foster, factory manager, Curtiss-Wright Corp., St. Louis. There must be a basic model with only necessary minor variations if benefit is to be derived from war volume production experience, he insisted.

Production of improved forgings and considerable savings in materials have resulted from wartime progress in the technique of producing alloy steel aircraft forgings, according to A. J. Pepin, chief metallurgist, Wyman-Gordon Co., Worcester, Mass. In each spider forging for three-blade propellers 6 lb. of metal were saved. Materials savings of 75 to 125 lb. per forging, plus considerable time saving, were effected in making one-piece propeller hubs with semi-pierced arms, and the finished product was metallurgically much improved. He recommended, postwar, close cooperation between designers and forgers to facilitate economical production of the necessarily smaller quantities of forged parts, especially since the original cost of forging dies and tools may be the important factor. "Frequently, by minor changes in the design of a forging, such as increased tolerances, increased radii, and draft angles, the cost of forging dies required to produce the part can be reduced as much as one-third or one-half," he said.

J. O. Almen, Detroit, head of Mechanical Department No. 1, General Motors Research Laboratories, was awarded the Manley Memorial Medal by the SAE for his work in developing methods and data for increasing the working strength of metals and of engine parts.

Cited for Awards

• • • **The following companies have** received awards for excellence in war production:

Army-Navy "E"

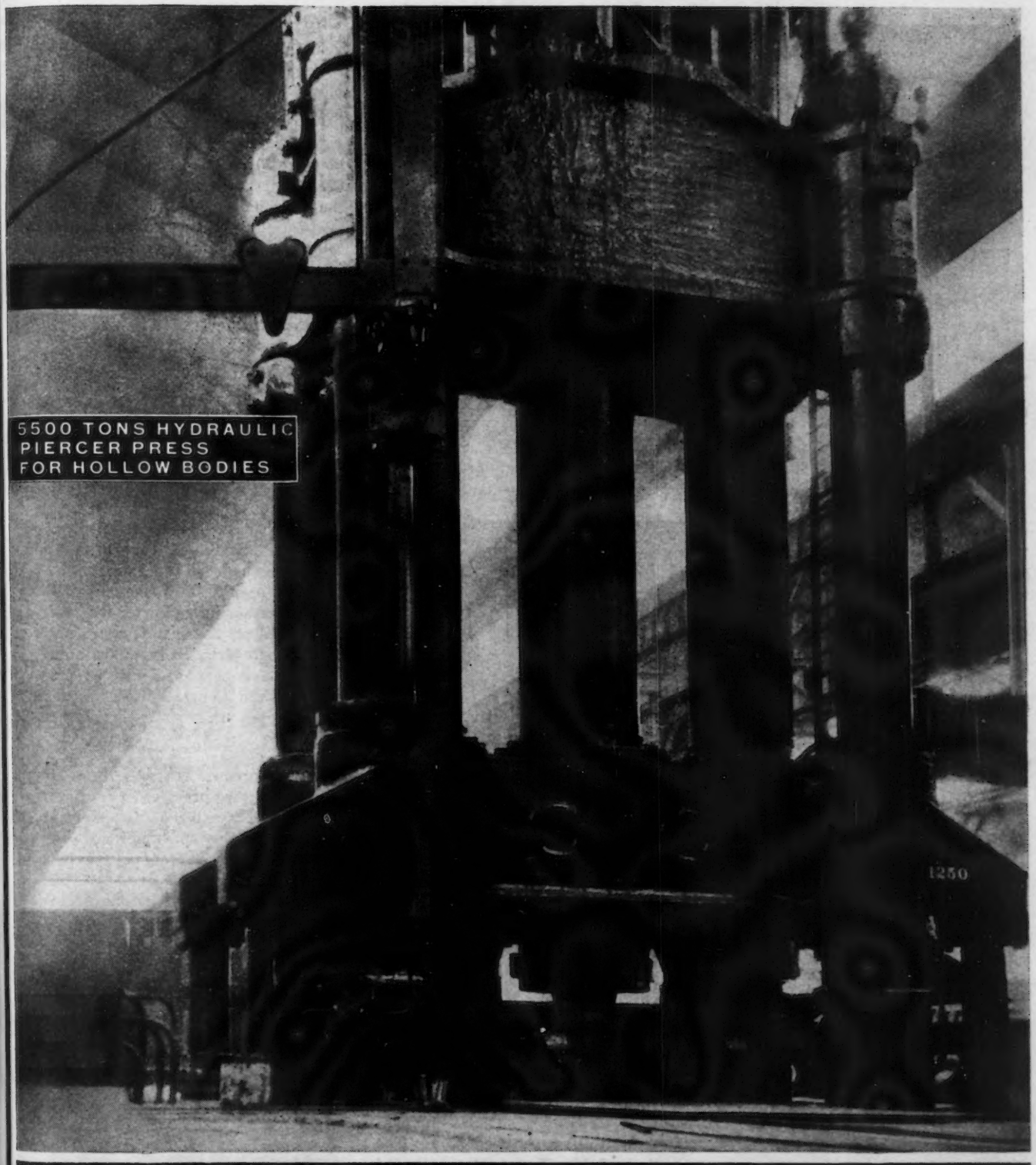
Copperweld Steel Co., Glassport, Pa. (second star)
Jenkins Bros., Bridgeport, Conn. (fourth star)
Cooper Alloy Foundry Co., Hillside, N. J.
Ingalls Iron Works Co., Verona, Pa.
Firth-Sterling Steel Co., McKeesport, Pa. (second star)
Philco Corp., Storage Battery Division, Trenton, N. J. (fourth star)
Hamilton Foundry & Machine Co., Hamilton, Ohio. (second star)
Altoona Factories, Altoona, Pa.
M. Backes' Sons, Inc., Wallingford, Conn.
Belmont Casket Co., Columbus, Ohio, Plant, Columbus, Ohio.
Blue Jay Mfg. Co., Huntington, W. Va.
Brook Mfg. Co., Scranton, Pa.
Chrysler Corp., Tank Arsenal Proving Ground, Utica, Mich.
Chrysler Motors of Calif., Los Angeles, Calif.
City Pattern Foundry & Machine Co., Detroit, Mich.
Corning Glass Co., Parkersburg Division, Parkersburg, W. Va.
W. B. Davis & Son, Inc., Fort Payne, Ala.
Douglas Aircraft Co., Inc., Oklahoma City Plant and Modification Center, Oklahoma City, Okla.
E. I. du Pont de Nemours & Co., Inc., Chemical Warfare Service, Marshall Plant, near New Martinsville, W. Va.
Federal Laboratories, Inc., Plant No. 3, Tunnelton, Pa.
Frantz Mfg. Co., Sterling, Ill.
Geometric Stamping Co., Cleveland, Ohio.
Hays Mfg. Co., Erie, Pa.
Hoover Ball & Bearing Co., Ann Arbor, Mich.
Hyland Laboratories, Los Angeles, Calif.
Imperial Knife Co., Providence, R. I.
Kadin Brothers, Inc., Mohawk Novelty Co., Inc., Hudson, N. Y.
Lakeside Laboratories, Inc., Milwaukee.
Lincoln Steel Works, Lincoln, Neb.
The Massillon Aluminum Co., Massillon, Ohio.
Oak Mfg. Co., Chicago.
Onondaga Pottery Co., Syracuse, N. Y.
Packard-Bell Co., Los Angeles.

Portland Mill Plans For Postwar Demand

Portland, Ore.

• • • **Correcting a recent report** from Portland, Ore., Hess-Ersted Iron Works there is now rolling flat bars in widths 2 to 6 in. inclusive—and in thickness ¼ to 1 in. inclusive. Rounds are being rolled in 1 to 4 in. diameters and half rounds from 1½ to 3 in. No square shapes are contemplated at this time, but small shapes will become available after the first of the coming year.

Postwar plans include special sections not now being rolled west of the Rockies. Alloys, and products for export schedules are being maintained on a single turn, though rolling facilities would easily permit another turn were additional skilled mill personnel available.



HYDROPRESS · INC.

ENGINEERS CONTRACTORS

HYDRAULIC PRESSES · ROLLING MILLS
STRETCHERS · PUMPS · ACCUMULATORS

570 LEXINGTON AVENUE · NEW YORK · N. Y.

PERSONALS

D. J. AMBROSE, Houston district sales manager, Jones & Laughlin Steel Corp.

• **D. J. Ambrose** has been appointed district sales manager of the Houston, Tex., office of Jones & Laughlin Steel Corp., Pittsburgh, succeeding **Frank Winslow**, resigned. **Howard Knobloch** has succeeded Mr. Ambrose as assistant district sales manager at Cincinnati.

• **Royal G. Parks** has been elected controller, National Malleable & Steel Castings Co., Cleveland.

• **A. Harry Sanders** has joined Enthone Co., New Haven, Conn., as sales engineer. Prior to his new connection, he was finishing superintendent of North & Judd Mfg. Co., New Britain, Conn.

• **J. P. Johnson** vice-president, has been elected executive vice-president, and **J. E. Allen**, assistant to the president, has also been elected vice-president, Aro Equipment Corp., Bryan, Ohio.

• **K. D. Smith** has been appointed manager of the Worcester Wire Works Division of the National Standard Co., Niles, Mich. Mr. Smith formerly was Washington representative of the B. F. Goodrich Co.

• **Harry E. Ladwig** has been made works manager of the West Allis foundries and pattern shops, Allis-Chalmers Mfg. Co., Milwaukee. **W. A. Meyer** has been appointed manager of dealer sales, succeeding **S. H. Gorham**, resigned.

• **Clifford M. Sorensen** has been elected a vice-president of the F. L. Jacobs Co., Detroit. Mr. Sorensen was president of the Continental Die Casting Corp., which was purchased last December by the F. L. Jacobs Co.

• **Lloyd C. Smith** has been promoted to assistant domestic sales manager of Heller Brothers Co., Newark, N. J. Before joining the Heller company, Mr. Smith was sales representative of the Nicholson File Co., Providence.

• **H. M. Benham**, formerly with the U. S. Steel Export Co., has joined A. Milne & Co., New York, as assistant to H. S. Hoyt, senior partner.

CHARLES R. TYSON, president, John A. Roebling's Sons Co.

• **Charles R. Tyson** has been elected president of the John A. Roebling's Sons Co., Trenton, N. J. He succeeds the late William A. Anderson. The election of Mr. Tyson places in the presidency the grandson of Charles G. Roebling, son of the founder. **Lieut. Joseph M. Roebling**, now serving abroad with the AAF, has been appointed chairman of the board. Lieut. Roebling has been first vice-president since 1936. **Archibald W. Brown** has been elected treasurer and **H. D. Rathbun**, secretary.

• **Ellis L. Spray** has been elected vice-president and general manager of the Westinghouse Electric Elevator Co., subsidiary of the Westinghouse Electric & Mfg. Co., East Pittsburgh.

• **Gale H. Fegley** has terminated 26 years of service as sales manager with Shunk Mfg. Co., Bucyrus, Ohio. His plans for the future have not been announced.

• **S. M. Cassidy** has been appointed vice-president of the Weirton Coal Co., Weirton, W. Va., subsidiary of the National Steel Corp., Pittsburgh. Mr. Cassidy has been manager of the company for eight years.

• **Myron B. Gordon**, formerly vice-president and general manager of the Wright Aeronautical Corp. and a vice-president of the Curtiss-Wright Corp., has been elected a director and appointed vice-president in charge of operations of the Fairchild Engine & Airplane Corp., New York.

• **William B. Meek** has been made manager of a new branch office of the Westinghouse Electric Supply Co. in New Orleans. **Russell N. Chapman** has been appointed apparatus and supply manager of the New England district. **Austin B. Watson** has been named purchasing agent for the newly established purchasing department in Dallas. **Robert Hills** and **A. C. Kacher** have been assigned as managers of the Central district stores, Detroit, and Minneapolis branch, respectively.

• **John Morrow, Jr.**, has been re-elected a vice-president of International Harvester Co., Chicago, after serving for more than two years as a colonel in the Army overseas. He will have supervision over the company's purchasing and traffic departments.

LIEUT. JOSEPH M. ROEBLING, chairman of the board, John A. Roebling's Sons Co.

• **Philip S. Hill,** formerly assistant manager of the Hyster Co.'s Eastern division at Peoria, Ill., has returned to Portland, Ore., as general sales manager. **Glen M. Ede** has been made assistant manager of the Hyster Industrial Truck Division; **C. B. Bamberg** has been made purchasing agent, and **B. G. Nordling** has become manager of the parts department.

• **Edward E. Stark** has been appointed second vice-president of the Ziv Steel & Wire Co., Chicago. He will continue as district manager of the Indianapolis branch.

• **Clarence L. Riegel** has been elected secretary and assistant treasurer of Luscombe Airplane Corp., Trenton, N. J.

• **F. E. Schaumburg,** since 1932 roadmaster for Chicago & Northwestern Railroad, has joined Caterpillar Tractor Co., Peoria, Ill., as railroad representative, Sales Development Division.

• **Forest W. King** has been made master mechanic at Warren City Mfg. Co., Warren, O., subsidiary of Graham-Paige Motor Corp. Mr. King was formerly master mechanic at Willys-Overland, Toledo.

• **Harry M. Dunn,** has been appointed sales and service representative for Eclipse Counterbore Co., Detroit, in the South Texas territory.

• **G. W. Shetler,** for the past two years general manager of Barium Steel Corp., Canton, Ohio, has been elected vice-president in charge of operations.

• **Willis F. Avery** has been elected secretary of the B. F. Goodrich Co., Akron, Ohio. Mr. Avery succeeds the late Shelby M. Jett.

• **J. W. Ackerman** has been appointed district sales manager of the New York and Boston territories of American Chain & Cable Co., Inc., Bridgeport, Conn.

• **Frederick H. Eaton,** sales engineer attached to the a.c.f. Washington office, has been transferred to the New York sales office, American Car & Foundry Co.

• **James M. Carry** has been elected a vice-president of the Pullman Co., with assignment to operating department headquarters in Chicago.

• **Roy T. Giles,** service director, has been appointed sales manager, Atlas Lumnite Cement Co., New York, U. S. Steel Corp. subsidiary.

• **Willard Simon** has been made assistant district sales manager of Republic Steel Corp.'s Cincinnati office.

HERBERT B. LEWIS, manager, Machinery Division, Lukens Steel Co.

• **Herbert B. Lewis** has joined Lukens Steel Co., Coatesville, Pa., and divisions, By-Products Steel Corp. and Lukenweld, Inc., as manager, Machinery Division. For the past 25 years he has been with Brown & Sharpe Mfg. Co., Providence, R. I. Most recently he has been with the National Research Council, and as executive secretary of the Manufacturing Engineering Committee of A.S.M.E. assisting in research and development relating to the war effort.

• **M. W. Cole** has been appointed assistant general manager of Western sales for Bethlehem Steel Co., with offices in Detroit. Until recently he has been chief of the plate and shape branch of the WPB Steel Division, prior to which he had been with Bethlehem about 20 years.

• **Norman W. Slohm** has been appointed in charge of sales of aluminum for the National Smelting Co., Cleveland.

• **William A. Mara,** formerly with Consolidated Vultee Aircraft Corp., has joined Bendix Aviation Corp., Detroit, as a staff executive.

• **Delmar S. Harder,** general manager of Fisher Body fabricating plants, General Motors Corp., has resigned effective at the close of the European phase of the war. **George C. Paterson** has been appointed general manufacturing manager, and **John J. Cronin** has been named general industrial relations director of the division.

• **Carl A. Cover,** manager of Bell Aircraft Corp.'s Marietta, Ga., plant, has been elected a vice-president of the company. Mr. Cover, formerly executive vice-president of Douglas Aircraft, became manager of Bell's Georgia division several weeks ago, succeeding **Omer L. Woodson,** resigned.

• **Allen E. Strasser** has been appointed controller of the research laboratory of the Curtiss-Wright Corp. Airplane Division, Buffalo.

• **John C. Lee,** formerly manager of the Aircraft War Production Council, West Coast, has been elected president of the Menasco Mfg. Co., Burbank, Cal. He succeeds **John E. Royal** who resigned because of ill health.

• **Fred G. Teufel** has been named Midwestern sales manager of the Storage Battery Division, Philco Corp., Trenton, N. J.

OBITUARY...

• **George W. Warner,** general manager of Armco International Corp., Middletown, Ohio, was killed September 23, when his private plane crashed at Hays, Kan. Mr. Warner, who was 47 years old, had joined the Armco organization in 1924. He was accompanied by **Paul H. Krusa,** sales engineer for Sheffield Steel Corp. of Kansas City, who also was killed.

• **Carl M. Yoder,** a leading machinery designer and manufacturer, and president of the Yoder Co., Cleveland, died September 28, at the age of 59. In 1910 he developed, perfected and built the first machine for the cold rolling and bending of steel. This formed the basis for the Yoder Co.

• **Earl L. Myers,** 52, general superintendent of Gisholt Machine Co., Madison, Wis., died September 20. Mr. Myers became associated with Gisholt in 1928 as a member of the engineering department, and, in 1942, was made general superintendent of all plants.

• **Simeon R. Tyler,** vice-president in charge of purchases of the Laclede Steel Co., St. Louis, died recently in that city. Mr. Tyler, who had been with the company for 29 years, was 60 years old.

• **Frederick Allison,** former chief electrical engineer of Ford Motor Co., Detroit, died recently.

• **Ray A. Hauserman,** 54, executive vice-president, E. F. Hauserman Co., Cleveland, died Oct. 1.

Fatigue Cracks . . .

BY A. H. DIX

Ethics in the Classified

I quote from an ad in the Los Angeles Times:

FOR SALE

Nationally known machine tool plant
Investigate now. Negotiate with principles.

Is this declaration against unprincipled negotiation a portent of a nobler world to come?

—*R. R. Kay*

Mr. Klagsbrunn's Sibilant

• • • Which reminds us to tell you that if you want to put in a bid for Willow Run or any of the other plants built by the Defense Plants Corp. the man to get in touch with is Hans Klagsbrunn, Deputy Surplus Property Director, RFC, Washington.

Mr. Klagsbrunn has a plant for every purse. Of course, in most cases you will have to wait until after V-Day before moving in, but this is none too early to start thinking about your layout, in the event that you have your eye on Willow Run, or the even larger Dodge Chicago plant. If you write to Mr. K. he will send you photographs, floor diagrams, and so on.

We know all about this as we heard Mr. K. tell about it in Washington the week before last. His excellent talk was marred only by an iron determination to rob *negotiate* of its *shee*. He pronounces it *nee-goe-see-ate*. If he owned a drug-store dictionary, as we do, he would know that there is only one pronunciation—*nee-goe-shee-ate*. And him a Harvard man.

Stopper

• • • Shot to Life for a Sentence of Longevity—*Lee Spring Co.*

Bump's Back

A fond belief of ours is that once a firm has drunk at your favorite family journal's fount, it can never be happy without us. Some try, and with a surface appearance of success, but we like to think that they are gnawing out their corporate hearts for us, and that only a stiffnecked pride prevents them from acknowledging their error.

Most of those who leave the one big and more or less happy family return soon, speeded on their return trip by our persistent prodding, as we permit no stray sheep to forget his past happiness. Among the most recent batch of returners to the fold is the Bump Pump Co., of LaCrosse, Wis., which we are especially glad to welcome back, not that it is an industrial giant, or that we know anyone there. It is just that we like the sound of the name—*Bump Pump Co.*

Candidates in Ectoplasm

• • • In the Statler at Washington we saw many Dewey buttons, and one Roosevelt. But most of all we saw blank blue buttons, which we take to be the badge of the independent voter.

Critic Confounded

• • • A recent advertisement of the Pennsylvania Salt Mfg. Co. contained this statement:

> The first ship built in America, the "Virginia," was launched from the shores of the Kennebec in 1607.

The accuracy of this was questioned by Thomas S. (Old Dominion Iron & Steel Works) Wheelright, Jr., who wrote:

> It is my recollection of history that the first English settlement at Jamestown was struggling for existence in 1607. Furthermore, my immigrant ancestor founded one of the first colonies in Maine at Wells and he didn't get over here until 1636.

We put it up to the advertiser and now have this explanation from Pennsylvania Salt's manager of sales, William P. Drake:

> In the Fall of 1606, George Popham and a group of followers from England was landed at the mouth of the Kennebec River at a point which is now called Popham Beach. The ship in which they came over to this country returned to England and left the pioneers to establish a colony.
>
> However, they had not reckoned with the rigors of a Maine winter, because by Spring, after a number of the settlers had died, those who survived decided to return to England. In order to do this, they built a small wooden ship which they named the "Virginia."

This, we hope, will be a lesson to Mr. Wheelright. If you see it in your favorite family journal it is practically always so.

Bingo Again

• • • "Industrial Marketing," which is the business papers' business paper, awards prizes every year for editorial excellence. This has been going on now for seven years. We have scored five times out of seven, and the current year is not one of the two occasions on which we have had to console ourselves by muttering, "What the hell do the judges know about technical articles?"

For this year we have received the first award *"for the best single article or editorial published during the twelve months ending July 31, 1944."* The winner is the 20-page study, "Continuous Casting," which appeared in the Feb. 24, 1944, issue. It was from the typewriter of T. W. Lippert, editor of THE IRON AGE, and even if we say it as shouldn't, the goddess of wisdom sat on the laps of the judges when they made their decision.

Parlor Oath

> You say your favorite place name is Still Valley. Mine is that lovely village in North Carolina—Amity Hall.
>
> But say it fast and the sound belies the meaning.
>
> —*G. P. McCracken, Jr.,*
> ***Atlantic Steel Co.,***
> *Atlanta, Ga.*

Puzzles

The answer to last week's jailer-prisoner-disk problem would take too much space. If you want it, write us at 100 E. 42nd St., New York 17.

Among those who sent in right answers to the Sept. 28 problem are D. A. (Delco-Remy) Cotton, A. R. (WPB) Mosier, Jr., F. W. (Freyn Engineering) Barrett, N. F. Gurley, B. H. Hawkins, Lt. R. F. Johnston, USNR, J. Malvern Benjamin, John (Helmco) Leeve, H. Kelsea (Eaton & Howard) Moore, Jr., and C. R. (Braeburn Alloy Steel) Cline. We had complaints about the time allowance. An anonym writes:

> *Scraping the green grelp off an antiquated slide rule which has lain untroubled at the back of the bottom drawer these many moons, I arrived at the answer in less than one minute.*

As we have been setting pars by the imperfect method halving our own time, we will forego time limits until our self-confidence returns. You can, therefore, set your own time for this one sent in by C. R. Cline:

> *A rectangle measures 20 ft. by 10 ft. A rectangular board, 10 in. wide, is placed diagonally within the rectangle and contacting at four points. How long is the board?*

A name worth remembering!

FAIRBANKS-MORSE

After the war, the name Fairbanks-Morse will continue to mark performance-proved products only, as it has for 114 years.

No race to get civilian products onto the market early will tempt us to break this pledge.

Fairbanks-Morse Scales are precision-built instruments which provide mechanically perfect weight recording. Of sturdy scientific construction without springs or delicate parts, the countless types, styles, and modifications serve American business and industry by keeping books, records, and inventories, saving time, preventing errors, and speeding production.

BUY MORE WAR BONDS

DIESEL LOCOMOTIVES • DIESEL ENGINES • GENERATORS • MOTORS • SCALES • PUMPS • STOKERS • RAILROAD AND FARM EQUIPMENT

FAIRBANKS, MORSE & CO., CHICAGO 5, ILLINOIS

Dear Editor:

FLYING BOMBS

Sir:

We in this country will agree (with reservations) with the statement in your July 6 *News Front* that if the German flying bomb had been perfected two years ago it *could* have won the war for Germany (we should prefer that the word "could" be altered to "might"), but I can assure you this thought entered the minds of the British people long before July 6.

It might also be said . . . that if the flying bomb had been perfected and produced in great quantities prior to Sept. 3, 1939, the war (a) would not have started, or (b) would have lasted less than three weeks. However, what might have happened is merely idle conjecture, and what has actually happened is much more to the point.

The past is gone and none can retrieve it. But what of the future? The best service that the widely read journals of your country can render is to point the way to the future, and to keep on doing that. We are told that "A strong man armed keepeth his castle," and there is no use arguing the truth of this, although prior to September, 1939, many British people might have been prepared to debate the statement.

Lord Roberts used to say, "To keep at peace a country must be prepared for war." It is along these lines that the great democracies of the world must think and act, unless we are to have a repetition of all this wretched business a quarter of a century hence.

H. RICHARDS,
Managing Director
Wolf & Co., Ltd.,
Hanger Lane, London, W. 5

GYRO-STABILIZER

Sir:

We are much interested in obtaining a copy of your article, "Gyroscopic Tank-Gun Stabilizer," on page 116 of your Sept. 21 issue. How may this be obtained?

GRIEG ASPNES,
Librarian
Brown & Bigelow,
St. Paul 4, Minn.

● Clipping is being mailed.—Ed.

FOOLPROOF GAGING

Sir:

You published an article in your Sept. 3, 1942 issue entitled "Foolproof Gaging System Developed by Army Ordnance." I quote from it: "The Ordnance Department system of controlling gages is also employed with great success. Traveling gage inspectors make frequent checkups of gages in use and keep detailed records of wear, so that gages may not only be replaced at the proper time, but also records may be built from which the life of all gages may be accurately predicted."

I am particularly interested in obtaining detailed information regarding this system, and will appreciate any information you are able to send me.

MILTON H. LIEBLER,
Production Engineer
Cleveland Pneumatic Aerol, Inc.,
20001 Euclid Ave.,
Euclid 17, Ohio

● We suggest you write Col. H. B. Hambleton, Ordnance Department, Pentagon Bldg., Washington, D. C., who is in charge of the Army's gaging program.—Ed.

RUTILE, ILMENITE, ZIRCON

Sir:

A consulting engineer in this area asks us:

"We have found a large deposit of rutile, ilmenite and zircon. Please let us know the urgency for these minerals. We are anxious to buy mining machinery and set up a mine if there is sufficient demand for these minerals."

Your comments and suggestions will be valued.

HEYWARD C. HOSCH,
Consultant,
Technical Advisory Service
Smaller War Plants Corp.,
1404 Candler Bldg.,
Atlanta, Ga.

● In rutile and ilmenite ores the important constituent is TiO_2. Both minerals are used in making paint pigments and porcelain enamel frits. To a limited extent they are used in the coating of paper and in welding electrode cutting materials. At present only one large deposit of ilmenite is being worked in the United States. It is the MacIntyre development of National Lead Co. at Tahawus, Essex County, N. Y. About $10 millions has been invested in a plant to separate the ilmenite from the magnetite ore body in which the ilmenite occurs. The process is extremely complex and costly. Heretofore, the chief source of ilmenite was India. Lesser deposits of rutile are being worked and information as to possible uses in arc welding electrode cutting can be obtained from Foote Mineral Co., 1619 Summer St., Philadelphia. As to the market for zircon, we suggest that your inquirer get in touch with one of the half dozen or so suppliers of the material.—Ed.

PRECISION CASTINGS

Sir:

To your list of sources of small precision castings, please add our name. Our company was a pioneer in this field and was the first to use this process on a large scale in the industrial field.

J. J. ERDMANN
Austenal Laboratories, Inc.,
224 E. 39th St.,
New York 16

WESTERN STEEL

Sir:

Your Sept. 7 article, "Western Steel —A Riddle of Uncertainties" is a most excellent one. T. W. Lippert again hits the "bull's eye"; in fact, the article is so much on the beam one might think he had been "reading everybody's mail." Could I have several reprints for special filing and further reference?

P. L.
San Francisco

● Bull's-eye hitter in this case was not our editor, T. W. Lippert, but our Chicago editor, Charles T. Post, whose name was omitted through error.—Ed.

Sir:

Your Sept. 7 issue has a very interesting article on the Geneva steel plant, which is located in Utah about 50 miles south of Salt Lake City. Can we get a copy of that issue?

RAY B. NEEDHAM,
Traffic Manager
Bamberger Railroad Co.,
Salt Lake City, Utah

● No more copies of the issue are available but offset reprints are being made of the article and one will be sent you.—Ed.

Sir:

Your "Western Steel" article is so full of worthwhile statistics that I would like to have four extra copies to send to friends who should be acquainted with the facts disclosed.

HARRY G. SPECHT,
Vice-President and General Mgr.
Eastwood-Nealley Corp.,
Belleville, N. J.

ALLOY SPECIFICATIONS

Sir:

The table in your Sept. 14 issue "Non-Ferrous Alloy Specifications" has proved of great interest to the writer and would have considerable value in a permanent file. Do you have reprints? We would like to purchase a minimum of six copies.

C. L. HODGSON,
Ordnance Division
Otis-Fenson Elevator Co., Ltd.,
Hamilton, Ontario

Sir:

The "Non-Ferrous Alloy Specifications" in your Sept. 14 issue will prove of inestimable value to us in our estimating procedure. If you have reprints we would like six copies, with bill.

J. R. VANCE
Briggs Manufacturing Co.,
12825 Taft Ave.,
Cleveland

● Because of the heavy demand for these tables, which were prepared by the Central Steel & Wire Co., Chicago, we are reprinting them in booklet form, 5¼ in. by 7¼ in. Copies will be available at cost which will be somewhere in the neighborhood of 25¢ for one, 16¢ each for five or more.—Ed.

G.I. UNION OPINION

Sir:

Can you inform us concerning a recent article you published on a poll of returned G.I. opinion with regard to labor unions?

ADA E. HODGSON,
Reference Librarian
Kellogg Library,
Kansas State Teachers College,
Emporia, Kansas

● See page 87 of the May 25 issue.—Ed.

A SPRING THAT IS COMPRESSED

WHEN IT IS EXTENDED

TYPICAL of the many unusual springs made by Muehlhausen is this *compression* spring which serves as an *extension* spring—designed for applications requiring an unusually high factor of safety. Interlocking drawbars—passing through the spring and looping around opposite ends—absorb the pulling force by compression instead of extension, and prevent a total separation of the suspended parts, should an extreme overload cause spring breakage.

MUEHLHAUSEN SPRING CORPORATION
Division of Standard Steel Spring Company
817 Michigan Avenue, Logansport, Indiana

MUEHLHAUSEN
SPRINGS
EVERY TYPE AND SIZE

This Industrial Week . .

- **Breakneck Steel Order Pace Subsides**
- **Landing Mat Program Cancelled**
- **Scrap Market Static; Composite Unchanged**

THE breakneck pace in steel ordering has subsided, steel output is heavier, the scrap market for the first time in weeks is static, reduction of backlogs has been accelerated and shipments this week are somewhat ahead of the volume of fresh steel business. Thus does October, a month of mixed trends, reflect a continuation, with more overtones, of the transition stage from heavy war production to probable civilian output.

With an advance in the steel ingot output this week and with a concurrent drop in orders, practically all mills are becoming anxious concerning their ability to set up economic rolling mill schedules in the last few months of this year. Cutbacks are increasing and the general delivery situation in the steel industry is not nearly as tight as it was a few months ago.

Cancellation of virtually all of the landing mat program is the biggest single event affecting the steel industry's outlook since production passed over the hump. The flat rolled products situation which had steadfastly been the tighest in the steel distribution picture, has finally been cracked. There are signs that before many weeks have passed the possibilities of greater production of civilian orders will be much brighter. While some mills plan to use newly found rolling mill space for further cutting down of backlogs, others are soliciting new sheet business to fill the gap.

Unless new or additional flat rolled business is picked up to replace landing mat cancellations and plate cutbacks, a reduction in raw steel output at some plants may be expected. Plate cutbacks by the Maritime Commission are expected to be steeper at an earlier date than was anticipated. Shipbuilding yards have gone on an "inventory hunt" with the heat on to reduce as much inventory as possible and as soon as practicable. One Atlantic coast shipbuilder is reported to have cut its inventory by 14,000 tons during the last month, and the Navy Bureau of Ships has launched a large surplus steel disposal program.

COMPETITION throughout the steel industry in the matter of soliciting business and scrutinizing each other's trade conditions, has been keen in the past week. One producer has reported new business recently to be the lowest in volume in the past 15 months. Buried beneath this avalanche of declining tendencies, was a Navy Department inquiry for steel drums involving about 24,000 tons of sheets, one of the largest tonnages ever offered. Lend-lease steel requirements, which in the past have often cushioned adverse temporary trends in domestic demand, will, for the fourth quarter, reach the lowest point than at any time since this method of supplying the Allies was instituted. Lend-lease steel shipments in the fourth quarter may not even reach 200,000 tons compared with past peak loads of more than 1,000,000 tons per quarter.

It is expected that lend-lease steel requirements for the first quarter of 1945 will be a negligible factor in the steel distribution picture. The bulk of such requirements will probably be for specialty steels and other finished steel products with little or no tonnage involving ingots and common grades of semi-finished steel. With British steel interests eager to resume regular commercial trading in steel items for export, lend-lease shipments to Great Britain are expected to dwindle rapidly. While regular steel export orders have been increasing recently, the expansion in tonnage has not been great enough to offset the decline in lend-lease steel shipments.

Should the European war continue through the winter months, there is adequate capacity and production to take care of urgent war needs and at the same time have an ever-increasing segment of the industry available for civilian output. It is believed that the bulk of the large war production program has been placed for European theater operations and is sufficiently large to take care of any exigencies.

With the automobile industry preparing firm postwar orders involving large tonnages, the significance of the revised flat rolled situation between individual steel producers is large. Mills whose plate producing efficiency on converted continuous facilities has been low will be carefully watched by competitors to see that the plate production directive is equaitably cut by WPB to insure that everyone gets an even break in the race for profitable sheet business. Steel companies which have been large producers of raw steel in the form of ingots or semi-finished items also have the problem of reconstructing their rolling mill schedules to make up for the decline in ingot and semi-finished steel shipments.

APPARENTLY sensitive to the mixed trends in the steel industry, the scrap market for the first time since the breakthrough several weeks ago is static this week. No major changes in price quotations have occurred at leading steel centers. This marking time may be a temporary period in which factors tending toward either further declines or a definite strengthening will materialize. Major open hearth scrap grades are now completely exhibiting the characteristics of a "free" market. THE IRON AGE scrap composite remains unchanged at $16.08 a gross ton.

National steel ingot operations rose half a point this week to 95.5 per cent of rated capacity. Contributing to this rise were the district output gains in Pittsburgh, up half a point to 94 per cent; Philadelphia, up one and a half points to 98.5; Cincinnati, up 14 points to 109 per cent, and the Eastern district, up 11½ points to 105 per cent. Only declines noted this week occurred in Detroit, down three and a half points to 101 per cent, the Western district, also down three and a half points to 89 per cent and Chicago down 4½ points to 95.5 per cent. Youngstown at 93; Cleveland at 96; Buffalo at 99.5; Wheeling at 91.5; Birmingham at 94, and St. Louis at 92.5 continue unchanged.

• **STEEL SUPPLY UP**—The estimated supply of steel that will be available to the steel products industry for the fourth quarter will total 16,085,000 tons, as compared with 15,900,000 tons, the estimated supply for the third quarter, WPB officials told the Steel Products Industry Advisory Committee at its recent meeting. The 185,000-ton increase is attributed to new facilities, which, however, are not yet operating at full capacity because of shortages of manpower, WPB said. As a result of cutbacks and cancellations, 100,000 tons of carbon steel and 25,000 tons of alloy steel have been reserved for usage under Priorities Regulation No. 25, the "spot authorization" order that permits civilian production. The remainder of returned allotments will be reassigned to the Office of Defense Transportation, Foreign Economic Administration, WPB's Office of Civilian Requirements and other agencies.

• **DESIGN CONTROL LIFTED**—The switch in war requirements is reflected in action taken recently by WPB when it lifted emergency specifications controlling the design of structural steel and reinforced concrete for building construction while continuing control of design and fabrication of stress grade lumber and its fastenings for buildings. When the steel control was applied steel was scarce and lumber was in good supply. The reverse situation now prevails.

• **MILCOR BUYS—Milcor Steel Co., Milwaukee, subsidiary of Inland Steel Co., has purchased J. M. and L. A. Osborn Co., Cleveland. Both firms manufacture and distribute sheet metal products. In addition to its Cleveland plant, Osborn operates warehouse branches in Buffalo, Detroit and Cincinnati. Osborn, which was established in 1859, will operate as a division of Milcor, and its present organization will remain intact.**

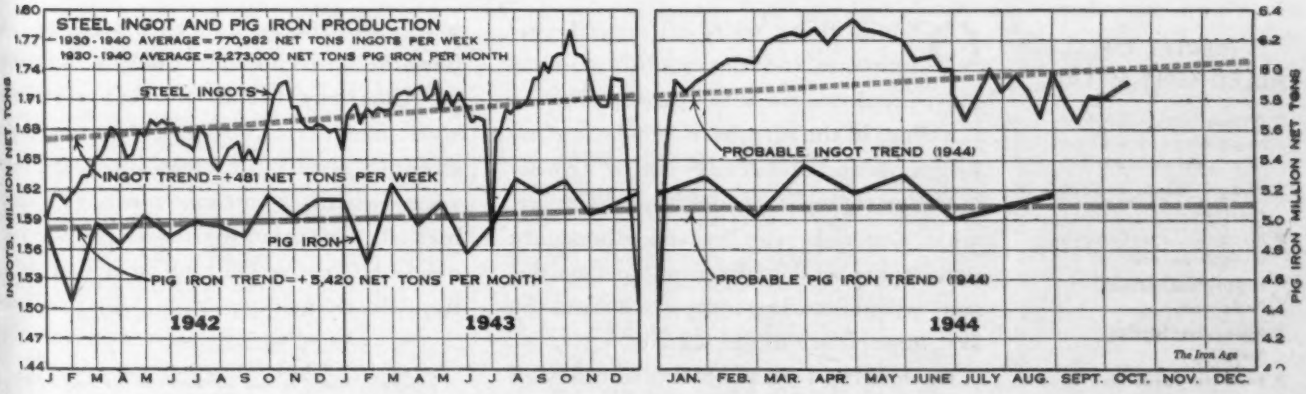
• **CANADIAN IRON ORE**—Steep Rock Iron Mines commenced production at its property in the Atikokan section of Ontario recently. With the putting into production of the Steep Rock property, Canada now has two mines producing iron ore. The New Helen mine, controlled by Algoma Steel Corp., has been producing beneficiated iron ore for about three years and is currently shipping upwards of 400,000 tons a year, about half of which is going to the United States and the remainder to the Algoma mills at Sault Ste. Marie. Production of the Steep Rock Mines is open-hearth ore which is vitally needed by the steel industry of this continent. The mines are estimated to contain 100,000,000 tons of the highest grade ore, equalled only by the Swedish variety. Present plans of the Steep Rock Iron Mines call for production of a minimum of 2,000,000 tons a year and it is stated that this supply will cut the steel industry scrap requirements by 9,000,000 tons.

• **POSTWAR STEEL**—While most steel producers expect that it will be no difficult job to reconvert to peacetime production, at least one of the smaller ones is now planning to "streamline" its mill. This firm will emphasize the distribution of its more profitable items, and de-emphasize those that are made on high cost equipment or that sell at little profit. Gradually, it is expected that either the high cost equipment will be replaced with newer equipment or the line will be discontinued.

• **POSTWAR ORDERS**—Many steel producers are now taking steel orders for postwar on a "when, as, and if" basis. There seems to be no particular pattern to such ordering. Warehouses and distributors are ordering considerable galvanized ware, such as sheets, siding, corrugated roofing, fencing and wire. Manufacturers who are still on war business are placing such orders for items including alloy and carbon tubing, pipe, cold finished bars and alloy bars, as well as many other products. As pointed out, there is no particular pattern to the ordering, with all types of industries coming in for a general cross section of steel producers items.

• **IRON ORE**—Shipments of Lake Superior iron ore from upper lake ports during September, according to report of the Lake Superior Iron Ore Association, amounted to 11,329,029 gross tons, a decrease of 1,413,792 tons from the shipment of September a year ago. This included 11,278,383 gross tons from U. S. ports and 50,646 tons from the Canadian port of Michipicoten, which in September, 1943, shipped 12,677,986 tons and 64,835 tons respectively. Cumulative total for the season to Oct. 1 is 65,550,487 gross tons from U. S. and 352,697 tons from Michipicoten, or a total of 65,903,184 gross tons. This compares with a grand total of 65,102,295 tons to Oct. 1 a year ago when U. S. ports had shipped 64,787,942 tons and Canadian port 314,353 tons.

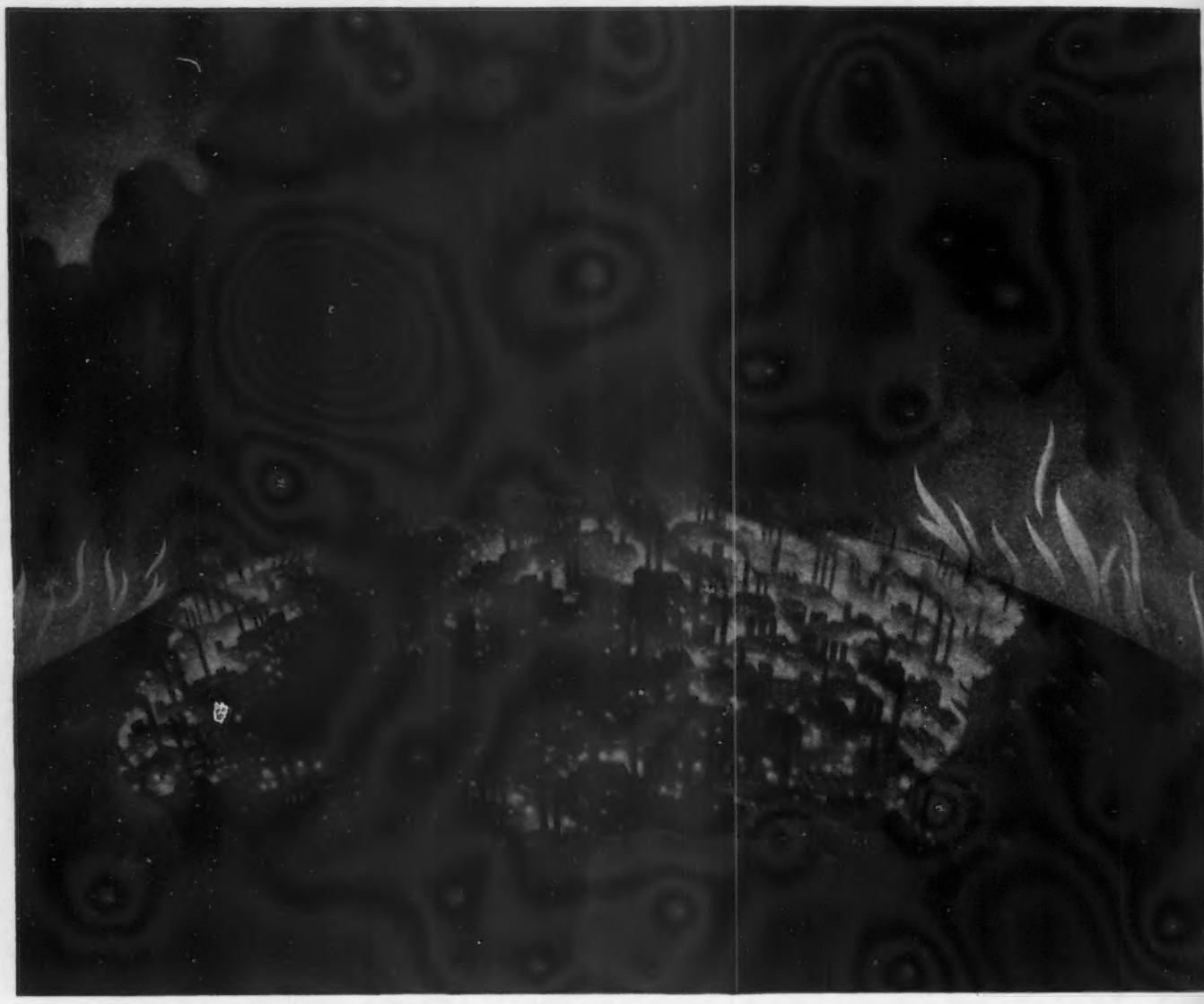
The Iron Age


STEEL INGOT AND PIG IRON PRODUCTION
1930-1940 AVERAGE = 770,962 NET TONS INGOTS PER WEEK
1930-1940 AVERAGE = 2,273,000 NET TONS PIG IRON PER MONTH
STEEL INGOTS
INGOT TREND = +481 NET TONS PER WEEK
PIG IRON
PIG IRON TREND = +5,420 NET TONS PER MONTH
INGOTS, MILLION NET TONS
1942
1943
J F M A M J J A S O N D J F M A M J J A S O N D
PROBABLE INGOT TREND (1944)
PROBABLE PIG IRON TREND (1944)
PIG IRON MILLION NET TONS
1944
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
The Iron Age

Steel Ingot Production by Districts and Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
October 3.....	93.5	103.0	93.0	97.0	96.0*	99.5	91.5	94.0	104.5	92.5	95.0	92.5	93.5	95.0
October 10.....	94.0	95.5	93.0	98.5	96.0	99.5	91.5	94.0	101.0	89.0	109.0	92.5	105.0	95.5

* Revised



WHEN THE FLAMES DIE DOWN OVER THERE—
what happens over here?

MERITS OF ALLEGHENY METAL

- ★ Great strength, retained at extremes of heat and cold.
- ★ Tough and impact-resistant.
- ★ Favorable strength-weight ratio.
- ★ Highly corrosion-resistant.
- ★ Inherent, lasting beauty.
- ★ Easy to form and weld.

ON one thing we're all agreed—the lights of industry in this country must die down as little and as briefly as possible, in the turn-back to peace. Getting tools and dies ready—knowing how you'll start, what products you'll make, what materials you'll need—those are patriotic as well as economic necessities *now*, without taking away at all from the first importance of the war.

In working your problems of redesign and new design, when you come to the matter of materials, that's where we can be of help. Remember that the function of Allegheny Metal, pioneer stainless steel in America, is always to *improve*: strength, service life, cleanliness, appearance—whatever means most in your market. Call on us for any assistance you need. Allegheny Ludlum Steel Corporation, Brackenridge, Pa.

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ALLEGHENY METAL

The Time-Tested Stainless Steel

W&D 9495 B

REMEMBER THE NAME TODAY FOR THE NEEDS OF TOMORROW

Lend-lease Steel Needs at Lowest Point

New York

• • • **Lend-lease steel requirements** for the fourth quarter will probably reach the lowest point than at any time since this method of supplying the Allies was instituted. In contrast with tonnage figures, which at one time exceeded 1,000,000 tons a quarter, lend-lease steel shipments in the fourth quarter may not even reach 200,000 tons.

In the past a goodly portion of lend-lease steel requirements were made up of ingots and semi-finished steels. The fourth quarter program, however, contains few if any ingots and semi-finished steel products. The bulk of the requirements represents finished steel products especially in the specialty lines. This is particularly true with respect to Great Britain which has always taken the bulk of lend-lease steel shipments. The sentiment there is said to be definitely set against the continuation of lend-lease steel which reflects a desire on the part of British steel interests to resume regular commercial trading in steel items, for export.

Currently it appears that first quarter lend-lease steel needs will be a negligible factor in the steel distribution picture and for all intents and purposes will probably reach an insignificant tonnage and figure. This prospect, if it materializes and there is little reason to believe otherwise, will mean that any sharp domestic decline in demand will not have a cushioning stop-gap in the form of heavy lend-lease orders. On the other hand, by the first quarter of 1945 regular steel exports may reflect an accelerating increase in tonnage.

While generally steel exports have been increasing in the past several months, fourth quarter support from that source is not expected to increase at the same rate as the decrease in lend-lease orders.

Anoher factor which may tend to depress lend-lease demand is the fairly heavy tonnage of steel in this country still awaiting shipment abroad. This unshipped steel may possibly amount to as much as 250,000 tons. Although such an amount represents about half of the total when supplies were seriously backing up some time ago, it nevertheless looms large in the light of present-day lend-lease demand. Furthermore, while there have been no public announcements and little or no public comment, it is believed that steel stocks in England in the form of ingots and semi-finished steel are quite substantial. No plates have been shipped on lend-lease accounts, except some special shipbuilding grades. The British, however, are still taking on lend-lease so-called steel specialties for which there is urgent need throughout the country.

While it can be expected that regular steel exports from this country will show a gradual and continuous increase as lend-lease declines or disappears, huge amounts of steel exports are not expected to be common until some time after the European war ends. Some sort of order must be created in countries abroad before normal commercial relationships can be adequately established.

See Less than 24,000,000 Product Tons of Steel Required After X-Day

Washington

• • • **Military demand** for steel in the year following X-Day will be less than 24,000,000 product tons, WPB sources indicate. This means that Army and Navy demand, plus the demands of the Maritime Commission and the Aircraft Resources Control Office, will be decreased by one-third.

WPB Operations Vice-Chairman H. G. Batcheller on Oct. 5 predicted that approximately 41,000,000 product tons or more would be available for civilian production one year after X-Day and said that this capacity will equal or exceed the output in 1939. Although this amount of the present 65,000,000 ton rolling capacity will be available, Mr. Batcheller did not prophesy what civilian demand will be.

He declared that this country will be able to create a prosperous new "metal age," with 1,000,000,000 lb. of aluminum capacity and 4,700,000,000 lb. of copper capacity available for use in civilian manufacture.

Pointing out that instead of a material shortage, he said that producers will be looking for orders. He said that 1937 copper consumption was only 3,700,000,000 lb. and the prewar peak of aluminum consumption was only 400,000,000 lb.

These predictions are based upon only a 40 per cent cutback in the Army Supply and ARCO programs and with little or no disturbance of the Navy and Maritime Commission programs. They are predicated upon the cutbacks which have been firmly scheduled by the services.

However, WPB Chairman J. A. Krug has told THE IRON AGE recently that it is his belief that the Army Supply program may be cut back as much as 55 per cent within the first six months after Germany falls. In this event, combined military demand for steel one year after X-Day may easily be less than 20,000,000 product tons annually.

Mr. Batcheller also said that the more than 750 WPB industry advisory committees will plan an important role in cutting back military production after X-Day.

The operations vice-chairman has issued instructions to all WPB bureau and divisions that they provide the information to industry advisory committees on all projected cutbacks so that they in turn may make recom-

Steel Predictions

• • • According to H. G. Batcheller, WPB operations vice-president, approximately 41,000,000 product tons or more of steel will be available for civilian production one year after X-Day. He said this capacity will equal or exceed the output of 1939. Although this amount of the present 65,000,000 ton rolling capacity will be available, Mr. Batcheller did not prophesy what civilian demand will be. Other WPB sources have indicated that military demand for steel in the year following X-Day will be less than 24,000,000 product tons.

mendations to WPB of which plants should be cutback first to insure smooth reconversion.

The cutback information will be made available in two forms: (1) by the military products concerned, and (2) by industries. With respect to components, recommendations may cover such areas as the timing of cutbacks, arrangements for quickly clearing out work in process and the regrouping of component and material orders by prime contractors.

The importance of the constructive advice and criticism of top executives of industry at advisory committee meetings was stressed by WPB in an effort to convince executives they should not send alternates to represent them.

Mr. Batcheller said: "We should like to have each member consider his presence at these meetings a personal responsibility and believe alternates should be accepted only when the success of a meeting depends on a particular firm's being represented."

He also suggested that to maintain working size groups, attendance by government representatives at industry advisory committee meetings should be restricted to a minimum number necessary. He urged government presiding officers to program meetings so that government representatives can appear at a definite time, participate in that portion of the meeting that concerns them and then leave.

Controversial OPA Report Will Delay Steel Wage Decision

Washington

• • • By dragging in the controversial OPA Research Division "secret" report into the WLB steel wage hearing on Oct. 5, CIO's General Counsel Lee Pressman may have succeeded in putting off the President's decision until after election day.

Mr. Pressman asked the board to secure the two-inch thick prejudicial report which concludes that the steel industry can afford to pay the union's demand of 17c. an hr. in additional wages without increasing prices.

WLB Chairman William H. Davis ruled that his order of the week before that allusion to the report by CIO President Philip Murray should be stricken from the record still stands, but that the Board would consider Mr. Pressman's motion. If the Board decides to request the report from OPA Administrator Chester Bowles, then the companies would be permitted a chance to study it and try to knock it down, Mr. Davis said.

Most informed sources believe that this would consume the time remaining before election. Observers cannot fathom the union strategy except that Mr. Murray must be relying upon the President to pay-off after election in consideration for the union's patience and forbearance from seriously embarrassing the President, and providing the Republicans with ammunition by insisting that the pay-off come before election.

Chester McLain, Steel Research Committee attorney, objected to Mr. Pressman's quotations from the OPA report and requested Mr. Davis to find out from Mr. Murray how he came into possession of the report which Mr. Bowles had dubbed "confidential," "preliminary" and which the Administrator "has not examined, much less discussed with members of his staff."

Mr. McLain said that the industry has no objection to the Board having all the facts, but that he did object to exparte statements. He was referring to the fact that the companies have not had any opportunity to study the OPA report or to refute its conclusions.

In his closing arguments, Mr. McLain said: "What the union asks is an agreement by which it can keep alive the fires of dissension by constant agitation for higher and higher wages. It does not seek wage stabilization." He declared that the employers had never been faced by some of the union demands.

The day before, Nicholas Unkovic, counsel for several steel firms in the Pittsburgh area, charged that politics are involved in the case and assailed the maintenance of membership policies of the Board on the grounds that it "enables a union if it so desires, to control the political destinies of its members under the economic threat of loss of their jobs."

Mr. Unkovic complained that the CIO, parent organization of the United Steel Workers of America, has allocated funds collected under compulsion of its members to its Political Action Committee which is engaged in political activity in which the members themselves have no voice. He said that the Board's policy with respect to the check-off and closed shop do not permit individual members to withdraw from the union if they disagreed with the action taken by the union.

Asked whether individual members couldn't seek redress from the union and if the matter were not an internal affair of the union, Mr. Unkovic cited a Baltimore shipyard case in which 44 members were expelled by the union for being too critical.

GOTHIC LINE ASSAULT: *In the central sector of the Italian front, a 155 mm. U. S. "Long Tom" gun crosses the Bailey Bridge over the Sieve River at Borgo San Lorenzo.*

Fire from All Quarters Is Aimed at New Surplus Property Act

Washington

• • • **The requirements of the new** Surplus Property Act that various tax-supported institutions, non-profit organization, states and veterans get first preference on buying property will in the opinion of officials of the now extinct SWPA, hamstring any orderly administration of the law.

Automotive executives are criticizing the Act's provision that plants shall be cleared within 60 days but that if the government has a contrary contract with a contractor, the contract shall take precedence over the statute.

One company which is extensively converted reports through its local representatives that this provision leaves the contractor just where he was before the law was enacted. If a firm's contract provides for clearance within 60 days, it must obey the statute. If the contract provides for a longer period before clearance is mandatory, the law doesn't operate.

This same company is running into a situation with respect to plant equipment disposal which must be duplicated many times throughout the country.

A change in contract necessitated changing the plant's layout, and in the process several hundred thousand dollars worth of copper duct was removed, becoming valueless to the contractor. Company representatives first approached local DPC officials with the request that they assume responsibility for approving a sale of the duct as scrap and relieving the contractor of the loss. If sold as scrap, the duct would only bring a few hundred dollars.

Visits to Washington did not result in getting any instructions of what to do with the duct. It was discovered that neither DPC nor RFC have any covering regulations. No official was willing to assume the responsibility for telling the company to sell the duct as scrap, nor for telling the company what to do with it.

Meanwhile, the duct is occupying space in the plant of the contractor and represents a problem in liquidation of its dealings with the government which must be solved before the company has completely discharged its obligations to the government.

It is understood that the foregoing example is being multiplied thousands of times in the large war production centers. Since according to the President the new Surplus Property Board will not be appointed until after election and several months may be expected to elapse before the Board is fully organized.

The United States Chamber of Commerce is most concerned about the fact that there will be practically no control over termination inventories as they are disposed of by the services. The Chamber will soon submit suggestions for repair legislation, which will include proposals that the Act be amended to provide tighter controls over these inventories to prevent glutting of markets before the new Surplus Property Board even gets started.

Other points on which amendments may be sought by various industry groups are: the merging of all disposal agencies into one agency; the devising of continuous constant property control with voluminous inventory systems on a regional and a national basis; and standards for classification of scrap.

Before he resigned Surplus Property Administrator Clayton told THE IRON AGE that industry groups have been almost indifferent to government attempts to get them to devote their energies and minds to a solution of the problems arising from the government owning tremendous property surpluses.

Indeed, trade association executives say that industries have so negligently ignored the situation that attempts to get them to study their problems and come to Washington and lay them before Congressional committees have largely failed. Obviously, this is the reason that present legislation is a target for so much criticism.

FDR Transfers Authority in Interagency Transaction

Washington

• • • **Providing for accelerated** amortization of war facilities built under certificates of necessity issued by WPB and the Bureau of Internal Revenue, the President by executive order recently transferred from the War and Navy departments to WPB the authority to issue certificates of non-necessity.

The new procedure to be administered by WPB will, for example, permit manufacturers to amend 1943 income tax returns to take deductions up to 50 per cent instead of 20 per cent on facilities started on Jan. 1, 1943, if a certificate of non-necessity is issued effective Dec. 31. This will permit a like deduction of 50 per cent for the 1944 tax year, thus completely amortizing a facility in two years instead of five.

Although manufacturers can amortize on a five-year or longer basis, WPB officials feel that concerns will prefer to choose the accelerated method of deduction.

CHILE SNOWSLIDE: *More than 100 persons were buried when this heavy snowfall hit the copper mining town of Sewell, Chile. To date, only 29 bodies have been removed. Sewell is situated high in the Andes mountains, south of the equator.*

Steep Rock Is Now Producing 3500 Tons of High Grade Ore Daily

Toronto

• • • **Steep Rock Iron Mines** commenced production at its property in the Atikokan section of Ontario recently. With the putting into production of the Steep Rock property, Canada now has two mines producing iron ore. The New Helen mine controlled by Algoma Steel Corp., has been producing beneficiated iron ore for about three years and is currently shipping upwards of 400,000 tons a year, about half of which is going to the United States and the remainder to the Algoma mills at Sault Ste. Marie.

Steep Rock Iron Mine which made its first shipment at the beginning of this month, now is delivering ore to the crushing-loading station at a rate of about 3500 tons per day, and officials believe that a rate of 5000 tons per day will be attained before the close of this season. First tonnage from the Steep Rock property is going to Republic Steel, the American interests who have worked closely with the Canadian company in testing the Steep Rock ore. Ten other American and Canadian steel producers also have ordered ore from Steep Rock mines. Canadian steel mills which have placed orders for large tonnages are, Algoma Steel Corp., Sault Ste. Marie; Steel Company of Canada, Ltd., Hamilton; and Dominion Steel and Coal Corp., Sydney, N. S.

At the mine, the "B" pit from which ore is being drawn, now is down to massive ore in connection with which officials state "it looks now like a solid iron deck." All the protrudences and the loose blocks of ore have been removed. Some have been shipped but any material over which there could be any doubt with regard to grade have been stock piled. It is desired to ship only the average of the deposit, high in grade and in all the other good characteristics, so that steel mills would secure a representative product for their significant first utilization of Steep Rock ore.

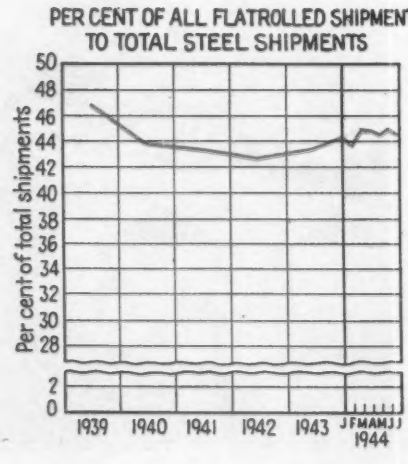
Steep Rock interests have been studying American iron ore markets and are not disturbed by the talk of lower shipments of iron ore from Lake Superior next year, or the talk of depression in the iron scrap markets this fall. Company officials state, "We are assured there is no need for apprehension on our part. The demand for Steep Rock highgrade is such as to make us feel that the market will take all we can give it. Ours is a special ore; it is not the common variety that feels any falling off of over-all demand. Certain grades like ours will continue in demand."

Production of the Steep Rock Mines is open-hearth ore which is vitally needed by the steel industry of this continent. The mines are estimated to contain 100,000,000 tons of the highest grade ore, equalled only by the Swedish variety. Present plans of Steep Rock Iron Mines call for production of a minimum of 2,000,000 tons a year and it is stated that this supply will cut the steel industry scrap requirements by 9,000,000 tons.

For the development of the Steep Rock property finances were arranged last year when the sum of $8,727,500 Canadian funds were made available. This total was $5,000,000 U. S. funds, secured by 4 per cent First Mortgage Bonds from the Reconstruction Finance Corp., Washington, D. C.; $2,025,000 U. S. funds proceeds of a 5½ per cent Debenture issue which (with 562,500 common shares) was underwritten by Otis & Co., Cleveland; $1,000,000 Canadian funds from Steep Rock's exclusive sales agent Premium Iron Ores Ltd. In addition the Governments of the Dominion of Canada and the Province of Ontario made available for this operation $4,000,000 for the construction of railroad, dock and power facilities.

The financing and marketing programs of Steep Rock Iron Mine are closely correlated with Cyrus S. Eaton of Cleveland and his associates who have undertaken, through their Canadian organization, Premium Iron Ores Ltd., to sell 10,000,000 tons of Steep Rock ore during the first 10 years of production, with a minimum guarantee of 500,000 tons in any full season. It is estimated that this will provide ample revenue both to service and retire progressively all Steep Rock's outstanding senior securities.

FLAT ROLLED SHIPMENTS: *The participation of flat rolled shipments to total finished steel shipments* has *not been changed much by the war. This has been due to the replacement of sheet tonnage by plate tonnage. Since 1939 there has been a decline in the per cent of all flat rolled shipments to total steel shipments, but it has been insignificant. In 1939 flat rolled shipments accounted for 46.5 per cent of all steel shipments and in July, 1944, they accounted for 44.1 per cent. Due to backedup demand for sheets, the postwar period will probably reflect a new high, temporarily at least, in the participation of flat rolled shipments.*



Apprenticeship Program To Accompany Reconversion

• • • **A revitalization** of apprenticeship, with opportunities for many discharged veterans to learn trades, is being planned to accompany reconversion after the defeat of Germany, officials of the Apprentice Training Service of the War Manpower Commission recently reported to Paul V. McNutt, WMC Chairman.

After a four-day meeting of management and labor representatives of apprenticeship programs in 20 states, Mr. McNutt said he had been informed that veterans will have opportunities to enter trades through apprenticeship in many fields, chiefly in metal working and construction industries. Approximately 120 apprenticeable occupations are now on the approved list of the Apprentice Training Service, he said.

It was the opinion of the management-labor apprenticeship representatives attending the conference in Washington that in the selection of veterans for apprenticeship in the various trades, consideration should be given as to age and physical disability, credit should be given for previous training or applicable experience and craftsmanship ability, and upon entering employment as an apprentice, he should be paid the wage rate applicable to the level for which he is qualified.

Consider Plan for Capacity Production to Parts Producers

Washington

• • • **A plan to permit** parts and components manufacturers to operate at 100 per cent of capacity as war orders decrease to fill up the supply pipelines for civilian manufacture demands after X-Day is being considered at WPB, Chairman J. A. Krug said recently.

While the parts for various consumer goods may be made soon, the end products themselves will not be permitted to be made until after Germany goes down.

At the same time, Mr. Krug said, the Requirements Committee has received cancellations of CMP tickets for the fourth quarter from the Aircraft Resources Control Office and the War Department amounting to more than 300,000 tons. Several weeks ago WPB was able to make a supplemental allotment of 175,000 tons of steel for civilian purposes from returned allotments. With the additional returned allotments and the original allotment of 220,000 tons to OCR, 500,000 tons of steel will be made available for civilian manufacturing purposes in the fourth quarter.

Automobile manufacturers have told WPB and the Army and Navy that permission to use one per cent of engineering personnel under Priorities Regulation 23 won't do much good since the services and WPB have refused to permit the use of ratings in the purchase of machine tools. The Army and Navy had already turned passenger car companies down when Mr. Krug gave the same answer for WPB last weekend.

The five manufacturers queried by the Automotive Council for War Production indicated that together their minimum needs for critical tools would only amount to 5700 units. The General Motors Corp. is said to want 4500 of these. The Ford Motor Co. says it does not need any, and if it does, can make them itself.

The auto industry has largely reserved all tools used in making 1942 models. The need is for bottleneck machine tools that got away during the war; some were sold, others were leased to the government. Some wore out, and still another class of tools cannot easily be reconverted.

When Mr. Krug told automobile makers that they could not secure ratings for machine tools he said that the reason was that to do so would be to give the automobile industry preferential treatment, and that obviously all industry could not be given the same privileges without overtaxing the tool industry, and possibly interfering with war work.

Some automobile companies have been chagrined recently to discover that while enough cutbacks are going to be made to permit them to reconvert, reduced rate contracts will be let to run all of 1945.

While some companies will not want to do this and have offered to telescope the production schedules and produce all required by the services in a few months, the services have turned this proposal down saying that it will be easier to reserve the capacity than re-engage it should the need arise. Army and Navy procurement officers also point out that the War with Japan may end suddenly and it would be foolish to have a whole year's production on hand, and only part of it would be needed.

No Easement of OPA Price Control During Early Reconversion

Chicago

• • • **Tight OPA price controls** must be expected by manufacturers contemplating reconversion to peacetime production in the near future, William F. Kelly, OPA price executive, said here in a recent address.

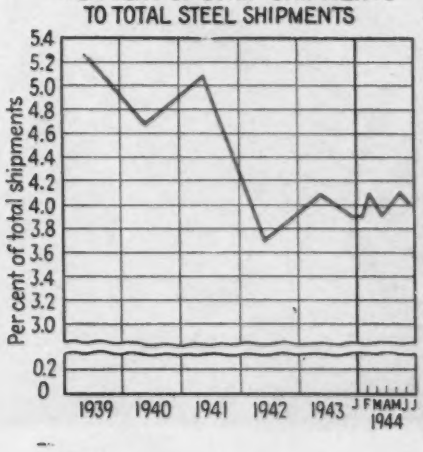
The reconversion price control of OPA is to maintain insofar as it is possible, the 1942 scale of prices. Departures from this basic policy will be allowed only when a manufacturer can prove to the satisfaction of the OPA that enforcement of the 1942 price policy is inflicting a hardship, Kelly said. Manufacturers will not be allowed to increase prices established before they went into war production upon reconversion to peace production without OPA authorization. If they act without such authorization, they incur the risk of heavy penalties.

They may, however, apply for a price adjustment prior to actual reconversion which, if granted, will enable them to continue plans for making the former product. Prices may be set on articles not previously on the market by the company making them, but in the event the company errs in computing its costs, thereby pricing the article at a price higher than the OPA approves, it is again liable to penalties.

Kelly assured his audience that the OPA policy will not be so inflexible as to harm industry. The agency is willing to allow for any increase in direct costs such as labor and materials, and allow an historical margin of profit in computing the new price at which the manufacturer can sell his product.

At present the OPA hopes to deal with the problem of pricing on an individual basis. Any large scale departure from this policy, such as blanket increases, might prove to be inflationary and get out of hand, it is feared. Prices on essential civilian items that are so low as to impede production will be adjusted upwards by the OPA, Kelly stated.

STRIP SHIPMENTS: *In 1939 steel strip shipments accounted for 5.3 per cent of total steel shipments and by 1942 they had sagged to 3.7 per cent of the total. During the first seven months of this year, the participation of strip shipments has been maintained at around four per cent of total steel shipments. In the postwar period it is expected that steel strip distribution, at least for awhile, will be slightly greater than in 1939. While the chart below indicates rather sharp changes in the participation of strip shipments, actual tonnages were not affected to a great extent, because such shipments were only a small per cent of total steel shipments.*



DPC Test Sale of Property May Be Standard Method of Disposal

Buffalo, N. Y.

• • • **What may be a standard** method of disposal of Defense Plant Corp. properties, should it prove successful, is being tried out in negotiations for the sale of the aircraft engine plant on East Delevan Avenue here, formerly owned by Chevrolet Division of General Motors Corp.

Although negotiations are now under way for the sale of the plant back to Chevrolet, DPC is advertising it in metropolitan papers and trade publications. The highest bidder will obtain the property. Indications are fairly definite that DPC is looking upon this sale as a test measure, which, if it seems satisfactory to all concerned, will likely be duplicated in many more cases.

No statement is forthcoming from Chevrolet, but company sources indicated that there is no particular dissatisfaction with the action of DPC in seeking competitive bids on a property which the original owner-operator wants back. Some industrial viewpoint was that the large companies which could afford purchase of such properties would in all probability have plants of their own, or under lease from the government, in which they would be more interested than facilities owned by other firms.

The Buffalo property consists of 13 acres of land with sidings and parking facilities, together with 12 buildings, two substations, boiler equipment, power lines, pump houses, oil storage, etc., including approximately 550,000 sq. ft. At present the plant is producing aircraft engine parts and will continue to do so until it is declared surplus at some later date. Formerly the plant was an assembly operation of Chevrolet's, the oldest of three factories owned in Buffalo by that company.

Rails Idle Due to Manpower Lack

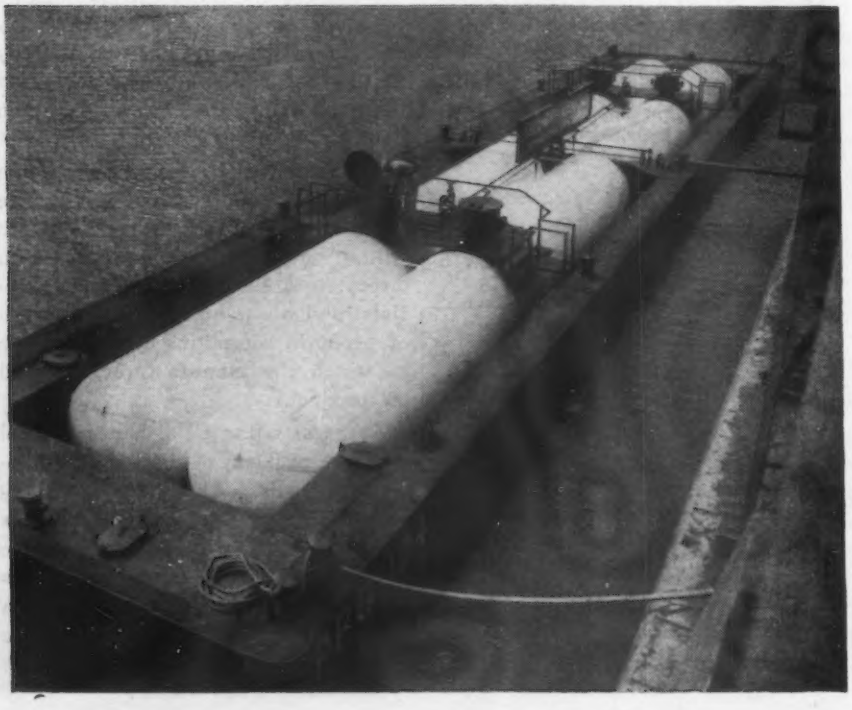
Pittsburgh

• • • **Rail and rail** laying supplies on hand by the railroads, especially those in the East, are not being used up as rapidly as the railroads would prefer, mainly because of the lack of manpower. Manufacturers of track bolts, tie plates, and other such accessories indicate that shipments have been mounting steadily during the past few months. However, it is reported that allotments to the railroads for this type of material during the fourth quarter will be about 18 per cent under asked for amounts, and for the first quarter of next year they will be about 20 per cent below the schedules of needed material set up by the railroads.

The effect on manufacturers of track supplies of heavy buying by foreign countries of railroad rolling stock, such as the French order for 700 locomotives for 1945 delivery, 1500 passenger cars, and about 74,000 freight cars, and the recent purchases by Mexico and Brazil, is not yet known since the track mileage to be built has not yet been reported. However, domestic business is quite heavy and any foreign business will be superimposed on an already loaded production schedule.

The general bolt picture, however, is another matter, especially in the face of the government owned surpluses of bolts. While these surpluses will not too greatly affect the railroad, utility, and industrial bolt picture, they might well set the general bolt industry, that which manufactures bolts for distribution through wholesalers and jobbers, back at least six months. The government owned surplus of the bolt market, according to one manufacturer, is believed to be the equivalent of about six months' normal consumption in the United States.

CHLORINE JOURNEY: *The world's largest shipment of chlorine, 380 tons, or enough to purify a year's supply of water for a city of three million, is ready to start a 230-mile trip by water from the Natrium plant of the Pittsburgh Plate Glass Co., New Martinsville, W. Va., to the Carbide & Carbon Chemicals Co., Charleston. The welded steel tanks each holding 95 tons of liquid chlorine, are 1¼ in. thick, 55 ft. long, and 7 ft. 8 in. in diameter.*



Machine Tools Exemptions

Washington

• • • **OPA last week** adopted amendments which, effective Oct. 11, grant to both new and used machine tools exemptions from price control in blanket leases by DPC such as previously applied to machines and parts. OPA said that blanket leases by DPC are so broad and varying in character that specific price control measures cannot be made to apply to them without difficulty.

East Coast Airlines Assure Curtiss CW-20 Postwar Start

New York

• • • **Two additional airlines,** Eastern and National, recently have made announcements concerning their postwar airplanes, both involving the use of CW-20 Curtiss Commandos. This is the first concrete indication that other aircraft firms will share the transport field which has been dominated in the past by Douglas and Lockheed. It is of course assumed that the already publicized Consolidated Model 39 commercial transport and the awaited commercial version of the Boeing Superfortress will find some purchasers.

Eastern Air Lines' announcement revealed that their plans for the next three years include the expenditure of $25,000,000 for an undisclosed number of CW-20 Commandos and Douglas DC-4's. Plans now call for the delivery of the two-engine Curtiss transports to begin in the fall of 1945, and the four-engine Douglases as soon thereafter as possible, war conditions permitting.

Exact prices for airplanes to be delivered that far in the future have not been determined, but it is estimated that the CW-20 will be priced at about $300,000 and the DC-4 at about $400,000. Informed sources in the industry estimate that Eastern's $25,000,000 expenditure will be broken down into about 70 airplanes, about 40 Commandos, and about 30 DC-4's.

The comparatively short range (200-700 miles) of the Commando adapts it particularly well to the brief trips on Eastern's route, up and down the Atlantic coast, while the DC-4's will bear the brunt of longer hauls. The 18 cylinder engines in the Commando give it considerably higher speed than DC-3's now in use on the commercial airways. The CW-20 is a development from a prototype produced before the war, though the first quantity order was for cargo versions for wartime uses.

During the war Eastern has been operating a fleet of Commandos for the Air Transport Command, principally on over-water routes. In over 10,000,000 miles of operation the company's records show no flights cancelled because of weather.

Production of the Commando has been steadily increasing since the beginning of the war, until at the present time it ranks either first or second in the field, with the workhorse Douglas DC-3, the other contender. This high production rate has doubtlessly influenced Eastern's decision, with the possibility of comparatively early delivery permitting a fast start in the lucrative eastern field.

National Airlines, with headquarters in Jacksonville, Fla., also has announced plans to purchase 16 CW-20's, at a cost of approximately $5,000,000. They expect delivery also about September of next year. National's schedules are well adapted to the use of the Curtiss airplane, consisting of short hops from New Orleans to Mobile, Tallahassee, Jacksonville, Orlando, Tampa, Miami and Key West.

Postwar Expansion Program Announced

Warren, Ohio

• • • **Plans for a $2,500,000** postwar expansion program for Packard Electric Div. of General Motors Corp. were announced here this week. The expansion will increase employment about 91 per cent above prewar levels.

About $1,500,000 will be expended to rearrange plant facilities and provide new equipment. The balance will go for new buildings, including a boiler house and a four-story building to house personnel offices, general offices and a larger cafeteria.

Current employment of 4000 persons will be increased to about 5200, as compared with 2700 in prewar. This enlarged payroll and facilities will make it possible to increase wire and bulk cable manufacturing facilities by 43 per cent, assembly by 45 per cent and motor manufacturing by 50 per cent.

The division functions as the outgrowth of the former Packard Electric Co., acquired by GM in 1932, and the former Sunlight Electrical Mfg. Co., which became a unit of the corporation in 1933.

September Plate Output

Washington

• • • **The WPB steel division** reports that plate output for September was 1,060,141 net tons, made up of the following:

554,013 tons of sheared plate, 113,482 tons of universal plate and 392,646 ons from the continuous strip mills.

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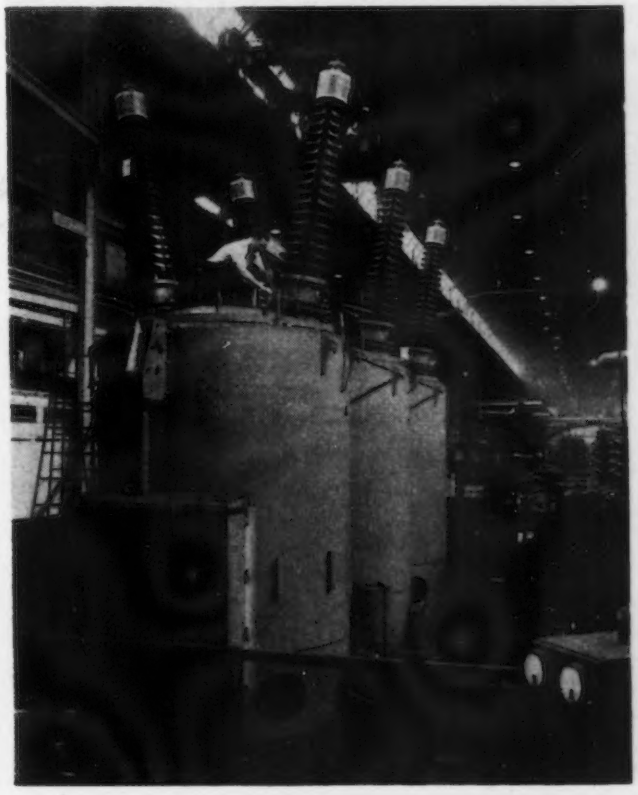

GIANT BREAKER: *A worker sets up this Westinghouse oil circuit breaker for Grand Coulee for its final test at the factory. The giant breaker is capable of interrupting 3½ million kva. It will also interrupt fault currents as high as 8800 amp.*

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War Manpower Commission Removes Controls over Present War Veterans

Washington

• • • **The War Manpower Commission recently removed all manpower controls for veterans of the present war. WMC Chairman Paul V. McNutt said the action was taken to speed the reemployment of returning veterans and to remove all employment obstacles in the way of their return to civilian life.**

Approximately 1,500,000 already discharged veterans will be affected by the order, as well as the 50,000 to 60,000 that are being discharged monthly.

The relaxation of controls will make it considerably easier for prospective employers to hire veterans. Under the order veterans of the present war are not required to secure or present statements of availability in order to change jobs. Veterans may also be hired by any employer without referral by USES or other authorized referral channels. However, any veterans of the present war who seek employment through USES will be entitled to a referral, as a matter of right, to any job of his choice, without regard to the essentiality or priority status of such job.

Veterans of the present war may be hired without regard to employment ceilings. However, all employees who are veterans of this war will be counted against an established employment ceiling unless the applicable local employment stabilization program provides for the exemption of veterans from employment ceiling determinations. No workers other than veterans of the present war and any other groups that may be exempted locally may be hired if employment is at or above the established ceiling.

The order applies to veterans who have served in the armed forces subsequent to Dec. 7, 1941, both male and female, and have other than dishonorable discharges. Local offices of USES will continue to give all possible placement and counsel assistance to returning war veterans, and although such veterans may be referred without regard to priority referral, local USES offices will continue to offer referral and priority and other essential openings to veterans.

Issue WPB Revocation Orders As Supplies Now Exceed Demands

Washington

• • • **With the increase of supplies and fulfillment of demands, numerous WPB revocation orders are being issued daily.**

Indicative of this trend was the announcement Oct. 6 of the revocation of five orders and two limitation orders under the jurisdiction of the Tools Division, of Order P-136, assigning preference ratings to processors of metal scrap for maintenance, repair and operating supplies, and of L-287, restricting production of portable conveyors.

In revoking the Tools Division regulation, it was explained that backlogs of unfilled orders for the items involved had been reduced sufficiently so that no difficulty is anticipated in meeting future requirements. The orders revoked are E-5-a, gages and precision measuring hand tools; E-7, metal cutting handsaw blades and hacksaw blades; E-9, precision measuring instruments and testing machines; E-11, foundry equipment and electric metal melting furnaces and M-211, heat treating equipment. The revoked schedules are schedules 5 and 6 to L-216, controlling the manufacture of files and vises respectively.

Delivery of tools and related products involved still are subject to Priorities Regulation 1, which provides for the filling of rated orders ahead of unrated ones. Delivery also is subject to other applicable WPB regulations.

P-136 was revoked because of the adequate supply of scrap. It was pointed out that availability of MRO materials is no longer a limiting factor in the flow of scrap. With the revocation of P-136, scrap dealers may use the ratings assigned by CMP regulation 5 to obtain maintenance materials. WPB said that deliveries already rated under P-136 will be completed, but no additional application of these ratings will be made.

With announcement of revocation of L-287, restricting production of portable conveyors, WPB said that this class of conveyors had been added to the list of equipment in paragraph (a) of General Industrial Equipment Order L-123.

GERMAN SUBMARINE PEN: *Canadian soldiers inspect one of the submarine pens at Boulogne, France, after they had liberated the city. Lifts on each side of the pen were used to raise the submarine out of the water.*

Sellers of Non-Ferrous Products May Figure Costs at Ceiling Prices

Washington

• • • **Claiming that it will afford greater stability and safety to the seller, while the effect on prices will be negligible, OPA has announced that, effective Oct. 12, sellers of nonferrous foundry products and die castings may figure their metal costs on the basis of OPA ceiling prices instead of on the basis of current metal prices as formerly required by the two regulations covering these castings.**

OPA, in giving its reason for making the changes, said that at the time the two regulations were issued all metals used by die casters and by the nonferrous foundry industry were generally selling at ceiling prices but that this is no longer true. It was stated that in view of variations in the metal market, especially the secondary market and present restrictions on forward buying, it is now impossible in many instances for a seller to make a fairly accurate estimate of his actual metal cost for a casting to be produced 60 or 90 days later.

The die casting regulation previously permitted only the seller who did his own alloying to figure his metal costs at the OPA ceiling, whereas the seller who purchased his metals was required to compute his metal costs on the basis of current delivered costs. The nonferrous castings regulation made no such distinction and required all sellers to use current metal prices in computing their prices.

Veterans Urged to Use U. S. Agency

Washington

• • • **Paul V. McNutt, chairman of the War Manpower Commission, recently urged discharged war veterans seeking empoyment to take advantage of the services offered by WMC's United States Employment service.**

Mr. McNutt pointed out that although honorably discharged veterans of the present war no longer are subject to priority referral requirements and other WMC regulations, all facilities of USES are at their disposal. Local USES offices, he said, are in a position to provide veterans with information on job openings, referrals to suitable jobs, counseling assistance, and other information and services related to employment.

USES, with about 1500 full-time local employment offices and 2000 part-time offices throughout the country, is equipped to give the widest possible coverage for referring veterans to available employment, Mr. McNutt said. These offices are provided with current labor market reports and occupational information on labor supply and demand, employer requirements for additional workers, anticipated layoffs, war production schedule changes and redistribution of war contracts. A nation-wide system of job clearance is maintained so that local USES offices are kept informed of job openings in all parts of the country and can arrange for the voluntary transfer of workers from labor surplus areas to other areas where there are job openings.

Mr. McNutt pointed out that USES has expanded its placement and job information services to effect a maximum use of the skills, experience and aptitudes of veterans returning to civilian employment. In this connection, he said, the USES office are now using "Special Aids" publications designed to help in the training, placement and adaptation of skills of discharged Army and Navy veterans in civilian jobs.

At the same time, Mr. McNutt said that USES has developed a job analysis method known as "selective placement," whereby a disabled war veteran is considered for any job that he has the physical capacity to perform. As a result, thousands of jobs that formerly were regarded as unsuitable for physically handicapped persons have been made available to disabled war veterans. Employers throughout the country are adopting the selective placement program for the employment of handicapped veterans, Mr. McNutt said. This is in contrast, he added, to the former emphasis on what the disabled veteran cannot do rather than what he can do.

The local USES offices will also provide discharged war veterans with information on training services and will arrange with the appropriate agencies for them to take whatever training courses are desirable, Mr. McNutt said.

Even though a returning war veteran may be referred to jobs without regard to WMC's priority referral system, he will be referred to any priority or essential war job for which he is qualified.

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POSTWAR TRANSPORT: ***A commercial version of the Curtiss C-46 Cargo transport now in use by the Army Air Forces, known as the CW-20 will be used by Eastern and National Airlines, according to recent announcements.***

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Plan to Revitalize Apprenticeship With Opportunities for Returning Vets

Washington

• • • **A revitalization of apprenticeship, with opportunities for many discharged veterans to learn trades, is being planned to accompany reconversion after the defeat of Germany, officials of the Apprentice Training Service of the War Manpower Commission recently reported to Paul V. McNutt, WMC chairman.**

After a four-day meeting of management and labor representatives of apprenticeship programs in twenty states, Mr. McNutt said he had been informed that veterans will have opportunities to enter trades through apprenticeship in many fields, chiefly in metal work and construction industries. Approximately 120 apprenticeable occupations are now on the approved list of the Apprentice Training Service, he said.

The apprenticeship representatives who met in Washington agreed that apprenticeship selection standards that have proved successful for non-veterans should generally apply to returning veterans, except for age and to a certain extent physical requirements, WMC said.

It was the opinion of the management-labor apprenticeship representatives attending the conference that in the selection of veterans for apprenticeship in the various trades, the following principles should apply:

1. For the purpose of apprenticeship selection, the veteran's age should be considered the same as when he entered the armed forces.

2. Consideration should be given to veterans with physical disability to the extent that the veteran is able to do the work required in a given trade.

3. Credit should be given for previous training or applicable experience the veteran has had, based on practical tests.

4. Consideration should be given to the veteran's maturity in determining credits, since in the training of the veteran there does not usually exist the problem of "maturing" the individual as well as developing craftsmanship ability.

5. If credit is allowed the veteran, upon entering employment as an apprentice he should be paid the wage rate applicable to the level for which he is qualified.

Apprenticeship representatives at the meeting agreed that joint apprenticeship committees and employers should develop procedures in the various states and local communities for evaluating service-connected or other previous experience of the veteran, as well as passing on the physical capabilities of the veteran and amount of weight given to his general ability to adapt himself to apprentice training conditions, WMC said.

It was agreed that in the selection of veterans, care should be exercised not to "oversell" apprenticeship to them. The apprenticeship representatives felt that returning veterans should know the "seamy" side as well as the best side of trades training.

Veterans should definitely not be encouraged to enter apprenticeship just because there is a current shortage of apprenticeship applicants, they agreed.

The apprenticeship representatives felt that the returning veteran is "likely to be mature perhaps beyond his years" because he "knows the meaning of discipline" and is not likely to overestimate his skill at a trade. It was emphasized that the veteran, however, should have an "informed desire" to enter apprenticeship training before he is selected.

The conference was led by William F. Patterson, director of the Apprentice-Training Service, which is a division of WMC's Bureau of Training.

The following persons attended the conference:

J. T. Weir, secretary, Arizona Apprenticeship Council.

Hickey Himstedt, Arkansas Apprenticeship Council.

Archie J. Mooney, secretary, San Francisco (Cal.) Apprenticeship Council.

James J. Clerkin, president, Connecticut State Federation of Labor.

Raymond E. Barnes, Florida Industrial Commission.

Eugene H. Jordan, director of apprenticeship, Honolulu.

L. C. Willis, chairman, Kentucky Apprenticeship Council.

Cyril M. Joly, chairman, Maine Apprenticeship Council.

Leslie W. Pratt, director of apprenticeship, Boston, Mass.

Henry Yeager, commissioner of labor, Montana Division of Labor.

Fred J. Hohman, former chairman, New Mexico Apprenticeship Council.

Clarence L. Beddingfield, director of apprenticeship, Raleigh, N. C.

William R. Volheye, director of apprenticeship, Salem, Ore.

Reuben Peterson, secretary, Associated Industries of Rhode Island.

G. Guy Via, Apprenticeship Council of Virginia and director of training, Newport News Shipbuilding and Dry Dock Company.

Andrew G. Gow, director of apprenticeship, Seattle, Wash.

Walter Simon, director of apprenticeship, Madison, Wis.

Carl S. Coler, chairman, Pennsylvania Apprenticeship Council.

Charles W. Harness, Commissioner of Labor for Iowa; Secretary, Iowa Apprenticeship Council.

H. V. Stirling, Director, Vocational Rehabilitation and Educational Service, Veterans' Administration.

James Carey, National Secretary, CIO.

Mrs. Clara Beyer, Member, Federal Committee on Apprenticeship; Assistant Director, Division of Labor Standards, U. S. Department of Labor.

Channing Dooley, Member, Federal Committee on Apprenticeship; Director, Training-Within-Industry, War Manpower Commission; Industrial Relations Manager, Socony Vacuum Oil Company.

William L. Batt, Member, Federal Committee on Apprenticeship; Vice Chairman, War Production Board; President, SKF Industries.

Edward Brown, President, International Brotherhood of Electrical Workers.

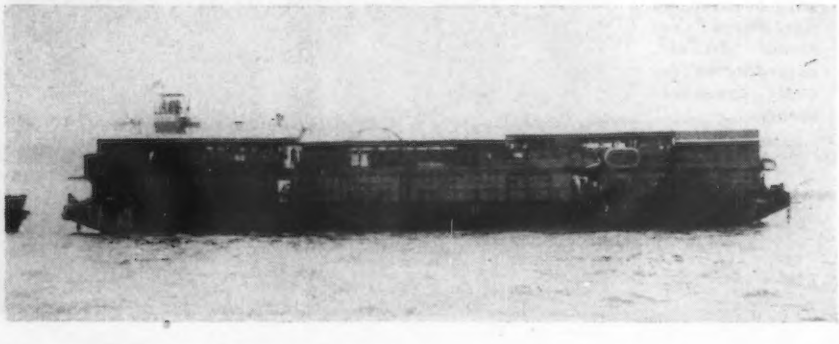
Robert McChesney, President, National Electrical Contractors' Association.

Edward Claude, Apprenticeship Coordinator, Trade and Industrial Education, U. S. Office of Education, Federal Security Agency.

James Kelly, Deputy Director, Trade and Industrial Education, U. S. Office of Education, Federal Security Agency.

Philip S. Van Wyck, Director, Bureau of Training, War Manpower Commission.

HOME SWEET HOME: ***Finding housing facilities completely inadequate, Navy "Seabees" have requisitioned a 1500-ton lighter anchored in the harbor and converted it into a houseboat for 200 men.***



Criticize Bowles Pricing Policy Announced by OPA on October 7

Washington

• • • **OPA Administrator** Chester Bowles' new pricing policies announced Oct. 7 are being called by critics an elixir fit for man or beast without offering a cure to either. While Mr. Bowles indicates he knows that undue delay in fixing reconversion prices will retard industrial recovery, the whole problem is minimized by the declaration that goods not now made only amount to 8.5 per cent of consumer purchases in 1941.

Fewer than a dozen types of goods make up over 85 per cent of the value of all items which may need a reconversion price, he says. The hundreds of miscellaneous items in the durable goods field amount to only 15 per cent of the problem.

"These, like the 85 per cent may or may not need new prices," the OPA Administrator said.

While emphasizing the importance of maintaining a balance between inflation and deflation, Mr. Bowles says that pricing policies in the reconversion period "must encourage the continued payment of high wage rates." At the same time, he says OPA's objective is to set ceiling prices for these new goods at prices prevailing in 1942.

The OPA Administrator said about a score of companies produce 80 per cent of all the goods which will be coming back into production and the remaining 20 per cent will be made by 25,000 smaller companies. Decentralized pricing by OPA regional and local offices will be done for the smaller companies.

Under consideration is a plan for pricing without OPA approval of the goods made by certain manufacturers in the consumers' durable goods field. The fixing of a minimum value of annual business, say $100,000, and second, by exempting manufacturers of minor parts from price controls, a part of the economy would be freed from OPA supervision.

To justify the OPA policy of a 1942 price freeze, Mr. Bowles cited examples of soft goods industries where costs of labor rose as much as 25 per cent and the cost of materials rose as much as 19 per cent, but price increases have been held down to increases ranging from 4 to 16 per cent. Mr. Bowles said this is good policy because of the high wartime profit position of the industries affected. Price control is going to be removed piecemeal, with the advice of industry committees.

Mr. Bowles expressed his personal philosophy: "Most of us think of free enterprise as a system in which prices are set by competition and the law of supply and demand. Unfortunately before the war this concept was true only in part of our economy.

"In too many industries prices were held up artificially in order to provide higher unit profits. Because of this policy, in some industries full production and full employment were curbed. In many cases, business men pursued a policy of high unit profits based on curtailed production, rather than going after the larger total profits that might have come through larger volume at a lower profit per unit."

Ask ICC to Restore Freight Rates

Washington

• • • **Railroads have** asked the Interstate Commerce Commission to restore increased freight rates that were put into effect March 18, 1942, but have been suspended since May 15, 1943. Request for the higher rates, beginning Jan. 1, 1945, was made in a reply filed last week to the ICC's order of Sept. 21, reopening for further consideration the rate increases originally authorized in Ex Parte 148. The railroads said the increases are necessary because the combination of increases of more than 25 per cent in the level of railroad wages and prices of materials, with freight rates no higher than before the war endangers the possibilities of postwar improvement to plant and equipment and better service.

The railroad petition for higher rates comes at a time when OPA is withholding its study on the request of the steel industry for increased prices. The official study will not be made public until after WLB announces a decision in the steel wage case, although a so-called secret OPA report was allowed conveniently to leak out to a few daily press correspondents. This report, a source of embarrassment to Administrator Bowles, said that the steel industry could absorb the 17c. an hour wage increase asked by the CIO-USW without increasing prices. Mr. Bowles has said that the report is preliminary and that he has not considered it. The assumption that OPA's report on steel prices will be keyed to WLB findings and is being withheld for that reason.

However, freight rate increases which the steel industry has not opposed would further raise steel costs, particularly with respect to raw materials and where manufacturers are required to absorb part of the costs of transportation.

The general 6 per cent rate increase asked would, if granted, be applicable to pig iron, iron and steel, scrap. Such raw materials as oil, bricks, etc., used by the steel industry in maintenance work would take an increase of about 3 per cent. There would be no rate increase on iron ore or coke.

RAILROAD WRECKAGE: ***The might of Allied bombs blasted these railroad yards in Laon, France into a mass of twisted wreckage.***

OCR Will Watchdog Civilian Goods Production during Reconversion

Washington

• • • OCR will perform as a "watchdog" on behalf of civilian consumers during the process of industrial reconversion after the defeat of Germany, William Y. Elliott, vice-chairman for WPB's Civilian Requirements Committee last week told a meeting of OCR regional representatives. Dr. Elliott said that OCR will be able to break whatever bottlenecks may develop in civilian production, guard against danger spots in the matter of civilian supplies, exercise some guidance if cases of maldistribution of essential consumer goods should arise and keep an eye on any tendencies toward exporting goods at the expense of essential civilian needs.

Much of the session was taken up by a discussion of possible ways of expediting the "spot authorization" program for the manufacture of civilian goods where manpower and facilities can be used without interfering with war production. Field men reported that their membership on Area Production Urgency Committees and Manpower Priorities Committees helped them considerably to support applications. It was the consensus that as manufacturing is begun under the "spot" plan, the appearance of new products will bring a greatly increased flow of applications and it was indicated that more materials would be made available to meet them.

Warehouse Inventories Appear Better

Pittsburgh

• • • Steel warehouses are currently in a better position inventory-wise than at any time since the beginning of the war. While they have difficulty getting suffieient flat rolled products, especially galvanized sheets, and some other galvanized products such as fencing, they are carrying heavier stocks of products and getting more steel than they have for many months.

Warehouses are now beginning to come out of their fool's paradise of fast turnover and large orders. For many months, warehouse stock turnover was very rapid, in some cases as frequent as every two months. Now they are beginning to slow up the turnover.

Also, during the critical period of the war, orders were for large tonnages, almost tonnages that could be handled by the mills. In fact, such orders during normal times are frequently handled by the mills. This is now changing, and, while orders are more numerous, the amounts involved are substantially lower and warehouses are more nearly serving in their normal capacities.

The old axiom that 20 per cent of the warehouse inventory makes up 80 per cent of the business is beginning again to be the case. The more popular items are maintaining a more rapid turnover, and the less popular items and sizes are slower. Manufacturers now are less willing, for example, to take oversize material and cut or machine it to size, so the less popular sizes are again approaching their normally slower rate of turnover in inventory.

COMING EVENTS

Oct. 12-14—The Electrochemical Society Inc., Buffalo.
Oct. 12-14—American Society of Tool Engineers, semi-annual meeting, Syracuse, N. Y.
Oct. 16-20—National Metal Congress, Cleveland.
American Society for Metals.
American Welding Society.
Society for Experimental Stress Analysis.
American Institute of Mining & Metallurgical Engineers, Iron and Steel Division and Institute of Metals Division.
American Industrial Radium and X-Ray Society.
Oct. 31-Nov. 1-2—American Institute of Steel Construction, annual meeting, Atlantic City, N. J.
Nov. 2-3—Industrial Management Society, National Time and Motion Study Clinic, Chicago.
Nov. 9-10—SAE Fuels & Lubricants, national meeting, Tulsa, Okla.
Nov. 27-Dec. 2—National Exposition of Power and Mechanical Engineering, New York.
Dec. 4-6—SAE National air cargo meeting, Chicago.
Jan. 8-12—SAE Annual Meeting, Detroit.

Will Discontinue Operations at Mingo Works by October 31

Pittsburgh

• • • Due to changes in requirements and a critical labor shortage in other plants of Carnegie-Illinois Steel Corp., the departments at Mingo Works, Mingo Junction, Ohio in the Pittsburgh district producing bessemer ingots, synthetic scrap, and pig iron will discontinue operations by Oct. 31, 1944, it was announced this week.

Mingo Works has been supplying other plants of the company with these basic products for conversion into finished steel. Now, owing to changing conditions, these products are no longer required.

Every employe affected by the shutdown will be urged to continue work with Carnegie-Illinois at its other Pittsburgh district plants. The critical labor shortage at these plants, which manufacture steel products vitally needed in the war effort, has been an important factor in the move to discontinue operations at Mingo.

Ordnance Department operations will continue, and it is expected that this department and related operations will employ about 700. This comprises nearly half of the present working force at the plant.

U. S. to Lease War Plants

Washington

• • • Secretary of Commerce Jesse Jones has announced that 25 contractors operating 325 DPC owned plants have indicated an interest in leasing or purchasing, "mostly leasing" them and preliminary discussions have been started with a few of the contractors. Mr. Jones sent 378 telegrams to operators of 586 war plants, asking if they were interested in negotiating for the purchase or lease of the plants and all but nine replied.

Seventy-eight contractors that are operating 120 plants have stated that they have not yet reached decisions, and 39 contractors that are now operating 55 plants said that they would not be interested in either buying or leasing.

No further details were given out.

Steel Production in First Nine Months Establishes New Record

New York

• • • **Production of steel ingots** and steel for castings during the first nine months of this year established a record at 67,199,467 net tons, according to the American Iron and Steel Institute. Last year during the comparable period 66,395,130 tons were produced.

The nine months' output this year exceeded the total production for the full year 1940, when 66,982,686 tons of steel ingots and castings were made.

Production during September this year at 7,193,496 tons was below August output of 7,469,800 tons and also was less than the tonnage produced in September, 1943, when 7,514,339 tons were turned out. During September this year, the steel industry operated at an average of 93.4 per cent of capacity, compared with a revised average of 93.7 per cent in August and 100.7 per cent in September a year ago.

During the nine-month period this year, the industry operated at an average of 95.7 per cent, against 98.1 per cent of capacity in the comparable part of 1943.

Production during the third quarter of this year totaled 22,137,593 tons, against 22,508,679 tons in the third quarter of 1943.

Present Army Schedule for Steel Landing Mats to Be Greatly Reduced

Washington

• • • **Affecting about** 140,000 tons of sheets in the fourth quarter and approximately 60,000 tons a month in the first quarter, OWI announced on Oct. 7 that present schedules for steel landing mats for the Army will be reduced more than an estimated $20,000,000 during a period extending through next March. The Army told the WPB Production Executive Committee Staff that changing needs of the war had caused a cutback of future production of landing mats.

OWI says that cutback applies to 21 plants scattered throughout the country and will cause a gradual layoff of an estimated total of 585 employes. The small number of workers to be released, the statement pointed out, is due to the gradual paring down of the program over a period of months and also to the fact that the plants generally are loaded heavily with other war work. Principal cutbacks were made in areas of labor shortage where the workers released can move quickly into other war work, said the PEC staff which approved the cutback.

Six of the plants affected by the cutback will absorb all of the labor which has been producing this material, in other departments of these works. They are the Empire Plow Co., Cleveland; Bethlehem Steel Corp., Lackawanna, N. Y.; Ceco Steel Products Co., Cicero, Ill.; Equipment Steel Products Co., Blue Island, Ill.; Butler Mfg. Co., Kansas City; and Lennox Furnace Co., Syracuse, N. Y.

Estimated layoffs, extending into November, in other plants are: Commercial Shearing & Stamping Co., 40 workers; Truscon Steel Co., 20; Youngstown Metal Products Co., 30, all in Youngstown, Ohio; Standard Railroad Equipment Co., New Kensington, Pa., 90; National Gypsum Co., Niles, Ohio, 65; Wheeling Corrugating Co., Wheeling, W. Va., 30; Round Oak Co., Dowagiac, Mich., 10; E. F. Hauserman Co., Cleveland, 35; Despatch Shops, Inc., East Rochester, N. Y., 10; Clark Grave Vault Co., Columbus, Ohio, 100; Lynn Metal Products Co., Aurora, Ill., 10; General American Transportation Co., East Chicago, Ind., 5; Morton Mfg. Co., Kansas City, Mo., 40; U. S. Fabricators, Inc., Wooster, Ohio, 90; United States Gypsum Co., Chicago, 10.

Mystery Strike

Chicago

• • • **Open hearth operations at Gary Works of Carnegie Illinois, the world's largest steel plant, were reduced to 15 per cent Monday this week and five blast furnaces were banked when 180 employees of the coke oven battery walked out in the morning turn. Twenty minutes before the beginning of the afternoon turn they were back at their posts but no work. The afternoon turn reported but would not charge the ovens. At 6 p. m. the company asked 70 foremen from various parts of the plant to charge the ovens. When the strikers saw this activity, back they came to work. Steel lost 8500 tons. Reason for the strike: Neither union nor company will state.**

Steel Stock Redeemed Without Outside Finance

Pittsburgh

• • • **Redemption of all** the preferred shares of Allegheny Ludlum Steel Corp. on Dec. 1, 1944, at $110 per share plus the regular quarterly dividend of $1.75 a share, will be made from working capital without assistance of outside financing, E. J. Hanley, secretary-treasurer of the company, announced today in sending formal notice of the proposed redemption to stockholders.

There are 28,388 preferred shares outstanding on which dividends amounting to $198,716 annually have been paid since the stock was issued 22 years ago. Following redemption, the amount of the annual preferred dividend will be available for the common stock of the company, equivalent to slightly more than 15 cents each on the 1,262,863 outstanding common shares.

Wiewel Leaves WPB, Goes to National Tube

Washington

• • • **Walter Wiewel** has resigned from the WPB Steel Division where he held the positions of vice chairman of the Production Directive Committee and Chief of the Tubing Branch to become assistant to the president of the National Tube Co. Before going with the WPB Steel Division, Mr. Wiewel was assistant general manager of the Jones & Laughlin Steel Corp.

Up Fourth Quarter Allotment

Washington

• • • **WPB on Oct. 10 announced** that the requirements committee has allotted 58,428 tons of steel thus increasing OCR's total allotment for the fourth quarter. The steel is for a miscellaneous list of civilian items.

Industrial Briefs . . .

• MERGING—Amsler-Morton Co. has merged with the Pennsylvania Industrial Engineers, Inc., Pittsburgh, which will continue operations as a division of Amsler-Morton in the Fulton Building, Pittsburgh. Oscar R. Olson has been elected president of Amsler-Morton.

• REPRESENTING — Dempsey-Ross Steel Co., Newark, N. J., has been made representative for the sale of plastiron and plastalloy in the northern New Jersey and metropolitan New York districts of Henry Disston & Sons, Inc., Philadelphia.

• LARGE LOAN—Reynolds Metals Co. has arranged a $25,000,000 VT loan to provide or replenish working capital for war production and war contract termination purposes. The credit, which carries an interest rate of 2¾ per cent, is available to the Reynolds Co. and its operating subsidiaries. It is made available by a group of 17 banks and was negotiated through the Bank of the Manhattan Co., which acted as agent.

• ACQUISITION—Continental Can Co., Inc., has acquired all of the assets and business of Mono Service Co., Newark, N. J., and will be operated as the Mono Service Division of Continental Can Co., Inc., and continue with the same personnel and policies as in the past.

• CONSOLIDATES—Joy Mfg. Co., Franklin, Pa., and Sullivan Machinery Co., Claremont, N. H., have made a working arrangement, and consolidation of the companies will become effective shortly. Joy and Sullivan are non-competitive but supplement each other in production of mining equipment.

• PRODUCING .22's — Savage Arms Corp., Chicopee Falls, has been authorized by the WPB to resume production of a number of .22 caliber rifles. The company expects to employ 1200 after the war, contrasted with 700 before the war.

• STOCK ITEM—Carboloy Co., Inc., Detroit, is now carrying extra-performance dies, specifically designed for the drawing of fine steel wire, of approximately 0.015 in. diameter and under and made from grade 999 cemented carbide. This particular grade of carbide is the hardest metal produced by Carboloy.

• RECEIVES AWARD—Brown Instrument Co. has received the National Security Award for outstanding wartime security measures, and also the O.C.D. pennant.

• TRAINING FILMS—Norton Co., Worcester, Mass., has added another industrial training film to their "Lessons in Grinding" series. This latest addition is on the subject of "Grinding Carbide Tools."

• DISTRIBUTORS NAMED — The Crosley Corp., Cincinnati, has appointed the Heating & Air Conditioning Supply, Inc., as distributor in the northeastern part of California and most of Nevada; and has also appointed the Superior Distributing Co. as distributor in eastern Kansas and western Missouri for the company.

• NEW LOCATION — Southland Machine & Engineering, Los Angeles, Calif., has moved to a new location at 2254 Venice Boulevard, Los Angeles. Wallace Sidney is general manager.

• NEW RECORDS—Jones & Laughlin Steel Corp.'s plants at Pittsburgh, McKeesport and Cleveland have established new production records in several departments for the month of September. At Cleveland the total iron and steel products shipped was nearly 2500 tons higher than its best record of September, 1943. At Pittsburgh the No. 4 blast furnace broke its best record and at McKeesport the production of 8-in. shells was increased by more than 35 per cent.

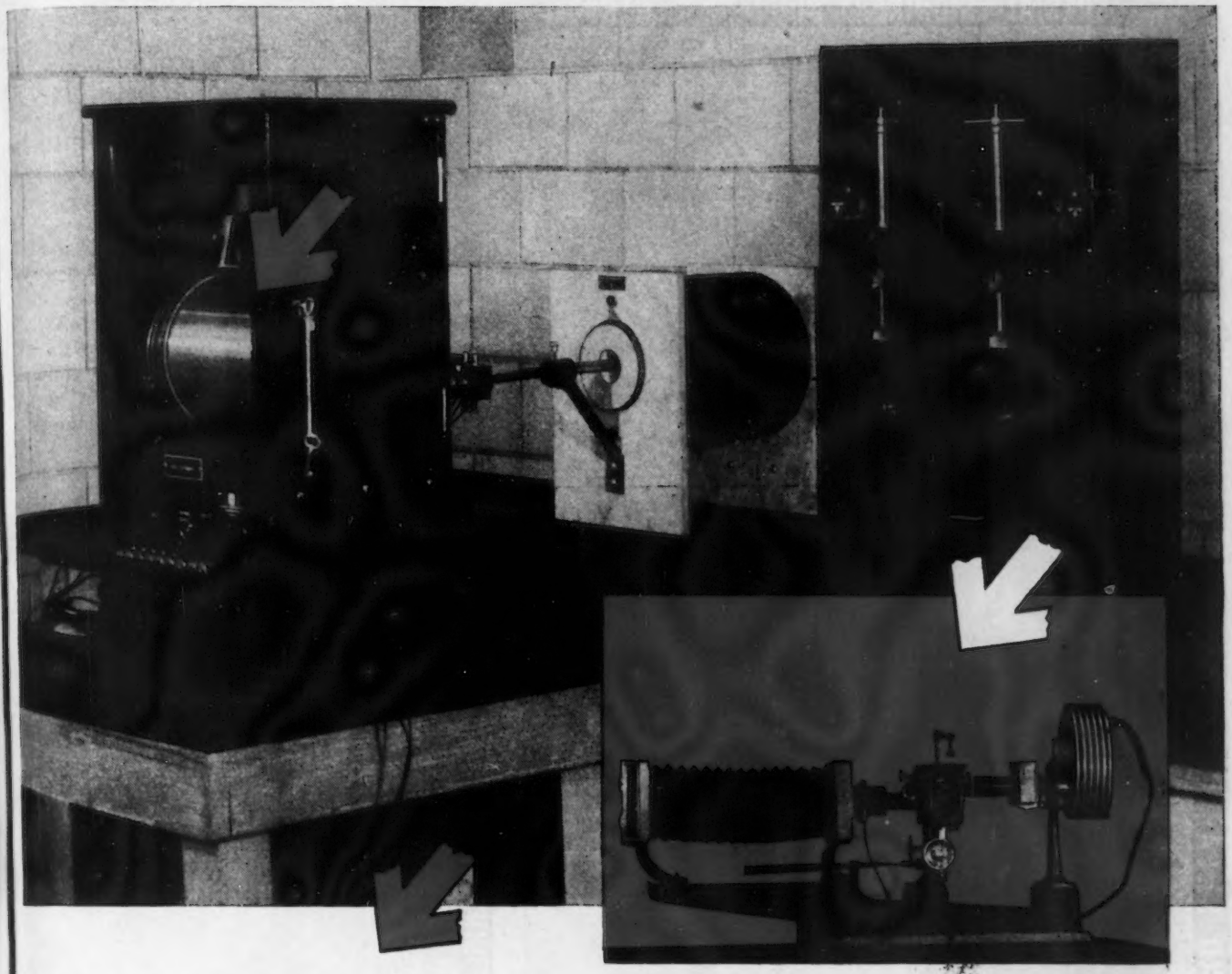
Contract Cut-Backs Serious in Canada

Ottawa

• • • **Canada is facing** serious cutbacks and wide-scale cancellation of war contracts, according to information gathered here over the past few days. The greater part of the cancellations will be from British and United States sources. It is stated that a decision has been reached to advance the date of cut-backs on British account by almost three months. Thus instead of the first phase of British orders ending with 1944, arrangements now are being made for almost immediate termination of these orders. Items affected by the new proposal will be chiefly rifles, guns, shells and some lines of instruments, weapons, etc., that no longer are considered of vital importance. On the other hand Britain will continue to take large quantities of motorized transport, armored vehicles, pontoons, landing barges, as well as special instruments, radio and communication devices. It is estimated that the over-all reduction may approximate 50 per cent while in some lines British production will cease entirely in Canadian plants. As British orders represent almost 70 per cent of Canadian war output, cut-backs and cancellations from this source will be a major proportion of Canadian output and it is estimated that some 150,000 workers will be affected.

Insofar as the United States is concerned, it is believed that Canadian war contracts from that quarter will continue until the end of the war in Europe, following which contract cancellations will average at least 50 per cent. Already some United States programs have been curtailed and others remain a matter of negotiation and decision. So far as information is available here, however, no over-all decision has been made similar to that of Great Britain regarding the advancing of the termination dates.

With regard to the Aircraft industry, a number of adjustments already have been made or are underway with the result that there is a possibility of a large drop in employment on this account over the next two or three months as programs are completed or cut-backs announced or pending go into effect.



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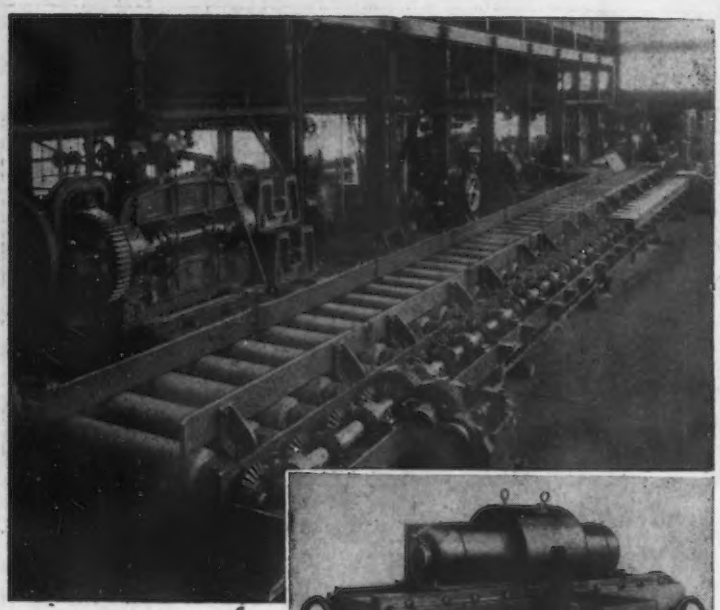

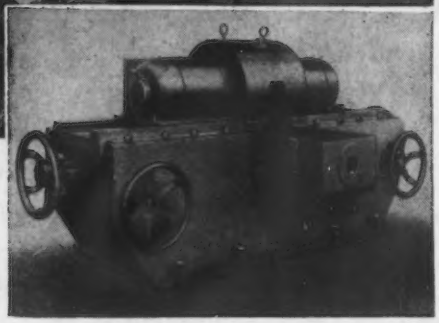

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Engineering Drawings Microphotographed By Navy Department

. . by EUGENE HARDY . .

Washington

• • • **The use of** microphotography for copying blueprints, drawings and plans of all types appears to have a bright postwar industrial future. In place of handling full size blueprints, correspondence and records, microfilming makes possible handling of very small reproductions, making storage and transportation problems considerably less. The Navy Department has been one of the pioneers in this type of work and microphotography is playing an important part in the work of each of the Navy's bureaus. This development points to application of the art to peacetime industrial practice.

In one of the early stages of its use by the Navy, a Naval officer, leaving Washington by air for duty at Pearl Harbor, tucked a roll of microfilm in each pocket and was off. Three days later the two reels, each containing tiny reproductions of 500 engineering drawings, were at the advance base. Mechanics consulted the film, then made urgently needed

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MICROPHOTOGRAPHED BATTLESHIPS: *To facilitate storage, shipment, and handling of engineering drawings, the Navy Department now utilizes a microphotographic process. The rolls of blueprints are reduced to easy-to-handle films for the use of ships and shore installations.*

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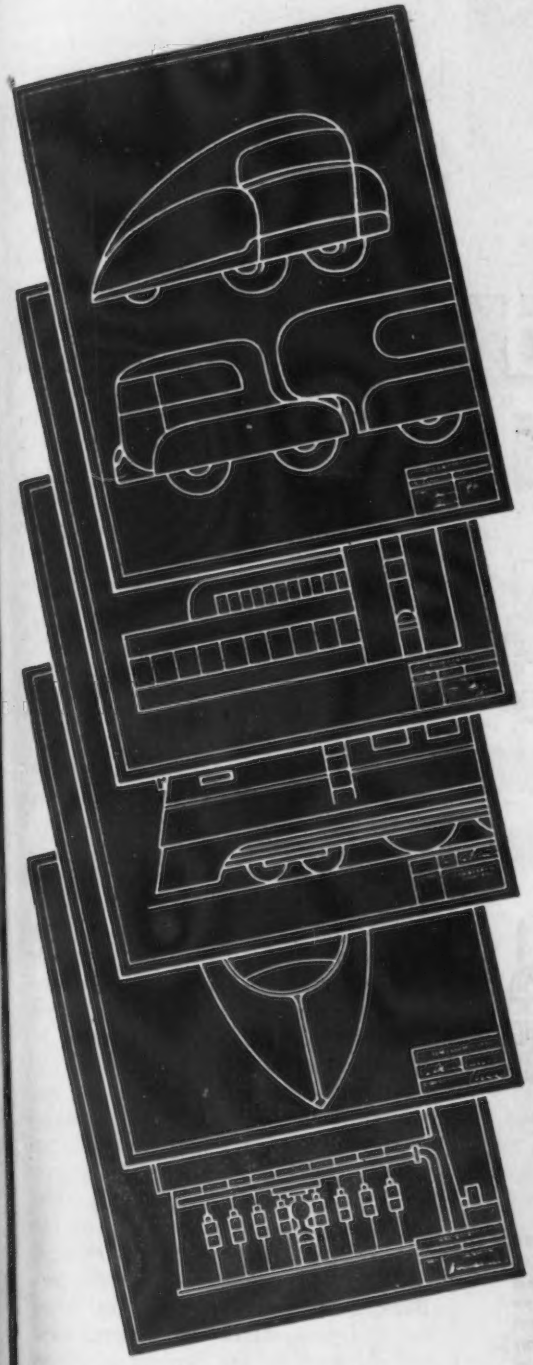

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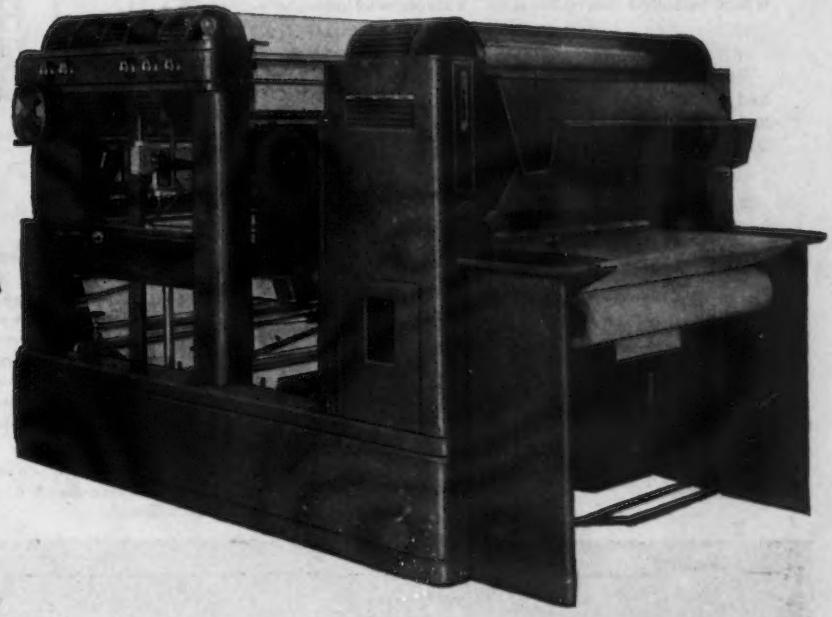

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Problem Solved

By Rosán Lock-in-Studs

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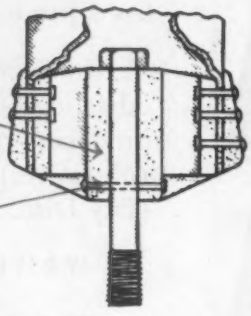
U. S. and Foreign Pats. Pend.

CASE HISTORY

THIS BOLT ● was provided on a cast aluminum attaching plug which was riveted in the lower end of a rudder assembly torque tube on a Glenn L. Martin Company plane. The bolt acted as a pivoting point for the rudder hinge, and passed from the plug through a ball bearing retained in a hinge fitting, which in turn was bolted in the tail of the plane. For proper adjustment, the inner race of the ball bearing was seated firmly against the lower surface of the cast plug by drawing up a castle nut. Because the bolt head was inaccessible (inside the torque tube and above the plug) this rivet ● was provided to prevent the bolt from turning during adjustment. Unable to withstand tightening torque, the rivet sometimes sheared during the last few turns of the nut.

When the bolt turned freely, there was no way to hold the inaccessible bolt head. As a result, in subsequent servicing or replacement of the rudder, the bolt was in danger of being pushed up out of reach inside the torque tube. In that case a teardown of the assembly which included the removal of 19 rivets was necessary



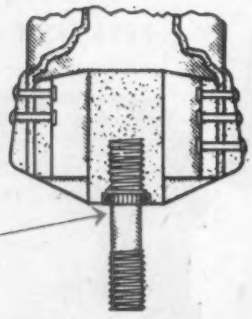
Rivet failed in shear.

THE PROBLEM

To substitute an attaching stud for the bolt. The stud had to be installed in a blind hole in this plug, and locked in against turning under the torque of drawing up the castle nut.

SOLUTION

A Rosán Lock-in-Stud ● used in the hinge assembly not only provided a more solid attachment point for the bearing, than was possible with a riveted bolt, but it facilitated assembly. The fact that the Rosán Stud could be quickly replaced in the same hole without disturbing the parent material was also a time saving feature in case servicing was required.



Stud provides tight union.

Rosán Lock-in-Serts and Lock-in-Studs are the solution to innumerable fastening problems in all types of industry. New applications for these fastening units are being developed and tested regularly in our engineering department. Manufacturers are invited to submit their problems. No obligation.

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3

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repairs to a ship which had been unable to return to action until then.

Had they been on paper instead of film, those plans would have weighed 128 lb., obviously too heavy to fit into the officer's pockets and too bulky to go by plane without displacing a passenger or some high priority cargo.

Now, however, film rarely needs to be rushed to the side of a damaged ship or plane. Instead, the plans are ready and waiting when she arrives for repairs, for the Navy is steadily sending to advance bases, tenders, aircraft carriers and repair facilities in general, microfilm copies of the plans of any ships or planes which might require assistance.

Portable projectors or large film readers are supplied to repair facilities receiving microfilm copies of engineering drawings. Larger facilities also receive a microfilm enlarger for making paper prints of any required drawing. Indexes to the film are provided either on the film itself or in booklets packed and distributed with the film.

From available information it appears that the Bureau of Ships has used microphotography to its maximum extent. This bureau has its own microfilm unit which prepares and indexes the drawings for filming and also distributes the film.

The bureau supplies plans of every diesel engine to tenders and the larger Navy yards and advance bases, each of which is equipped with a reader and enlarger. Aboard each ship or mine sweeper or larger class is a complete set of plans of the diesels installed in each.

Microfilming of machinery and electrical installation plans of ships already in commission and still in active use was begun with destroyers on July 3. About 120,000 copies of machinery indexes now are being distributed to spare parts distribution centers, advance bases and tenders. Blueprints covering complete plans for all new construction are sent from the shipyard to the Bureau of Ships, which makes microfilm copies for distribution to Navy yards and bases. Hull plans for all PT boats, patrol craft and landing craft are now on microfilm. Eventually this will cover all ships. All recent classes of submarines are being supplied with film in either reel or cut form. Cut film is supplied in specially designed cabinets. All alterations also are being sent out periodically on cut film.

The Bureau of Aeronautics has a microfilm unit similar to that of the Bureau of Ships and sends to over-

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SMITHway Electrodes in action *on sections for a SMITHway Multi-Layer Vessel (on the right after machining); 42 inches in outside diameter with 5½-inch wall thickness; for operation in a war plant at 4,500 pounds per square inch.*

WHEN the war started, everybody — including the Axis — was sure American industry couldn't build enough high-pressure vessels to produce the immense quantities of explosives necessary for waging global war. There just wasn't enough forging capacity available to turn out these giants, but Multi-Layer welded construction, pioneered by the A. O. Smith Corporation, solved the problem.

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SMITHway Certified Welding Electrodes are the best that money can buy because we have a double interest in making them right. No other electrodes go through as thorough production controls — are so scientifically checked and rechecked both in the laboratory and on the production floor.

The code number on every box of SMITHway Certified Welding Electrodes is your assurance that they will give you better welding results at lower costs on the big jobs that you and we call upon them to do. Specify SMITHway Certified Welding Electrodes. Made *by* welders — *for* welders.

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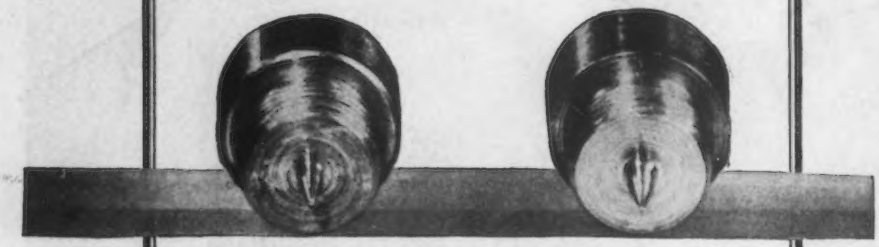
before and after



How the right cutting fluid pays

FIRING PINS or cylinder barrels . . . shells or ship shafts . . . plants that make them use cutting fluids—most often *good* cutting fluids. Often, however, one cutting fluid is expected to fit every job. Usually it won't, for when the operation—speed, feed, tools or stock are changed a new set of conditions exist. That means the cutting fluid factor must be considered carefully on every job—and the *right* fluid determined for it. Such consideration pays well.

The stainless steel parts illustrated above are a good example. It is obvious from these unretouched illustrations that the piece on the right has the better finish on both face and thread. This improvement over the left hand piece was due solely to a change in cutting oil to the *right* oil for the job. And this *right* oil proved to cost 14c per gal. less, on the machine. In this case a simple blend of Stuart's Thred Kut 99 was the answer—but it might have been any other of several Stuart Products.

AT THE METAL SHOW . . .
the above parts and hundreds of others will be on display at the Stuart Oil exhibit —drop in.

The important fact is found in the experience and specialization of Stuart Oil Engineering in applying proved products . . . in helping you find the *right* cutting fluid with the least trouble and cost to you. Let a Stuart Oil Engineer work with you.

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haul and repair facilities, including aircraft carriers, microfilm copies of drawings for every type of plane. These copies are made in the plant of the contractor.

All carriers are now supplied with microfilmed drawings of the aircraft that are based in them. Some planes require as many as 20,000 plans, all of which can be included in 25 rolls of microfilm. More than 30,000,000 filmed drawings of aircraft have been sent out.

All technical changes now are being microfilmed in the Bureau of Aeronautics as they occur and air-mailed every 24 hr. to facilities overseas and afloat. A daily average of 5000 pieces of vital technical information is thus being distributed. Microfilming of airplane engines and turrets is now nearing completion.

In the Bureau of Ordnance approximately 20,000 torpedo drawings are being microfilmed, copies of which are to be sent to 165 Naval units ashore and afloat. Approximately 6000 aviation ordnance drawings have been filmed and negotiations are underway to microfilm approximately 700,000 additional ordnance drawings for similar distribution. In the Marine Corps plans for all major guns, from the smallest to the largest, have been filmed.

The Navy first tried microfilming for this purpose in 1942 as a means of speeding the return of American submarines to Japanese sea lanes. It has been found that engineering plans on film take up about 1 per cent of the space required for the same plans on blueprints. Microfilm thus makes it possible for repair facilities, in spite of transportation difficulties and limited storage space, to receive and stow many times the number of plans they could accommodate in blueprint form. As a result, the types of ships and planes which can be serviced quickly and effectively at various repair facilities have been increased manyfold.

WPB Revokes L-196

Washington

• • • WPB, recently revoked L-196, which controlled the sales of used construction machinery. Among reasons given for the revocation were that the great majority of used cranes, shovels, motor-raders and tracklaying tractors in good condition are busy and contractors now want new machinery, not used items.

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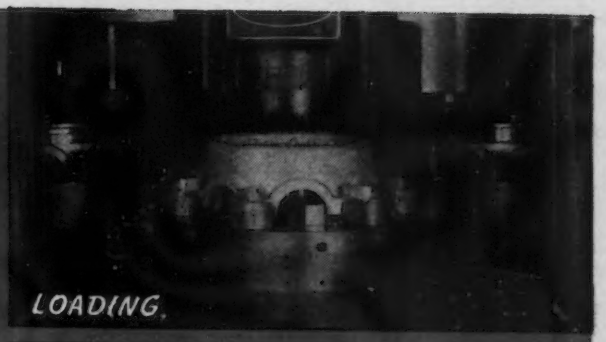

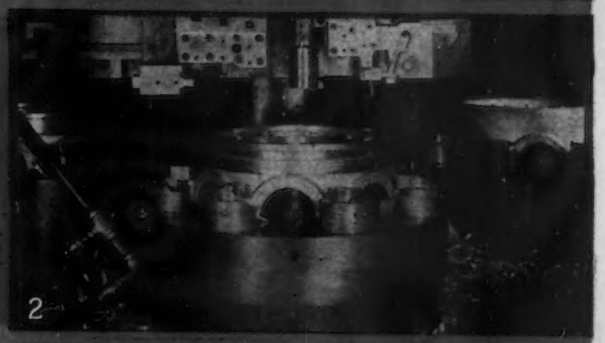

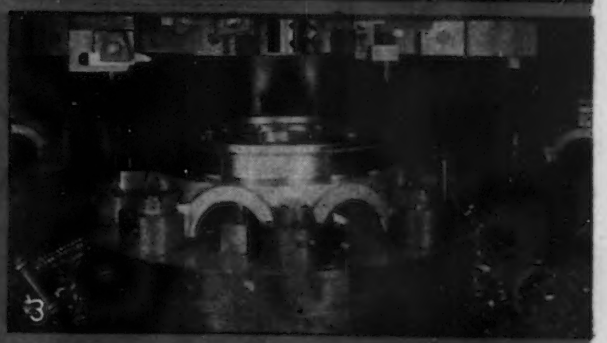

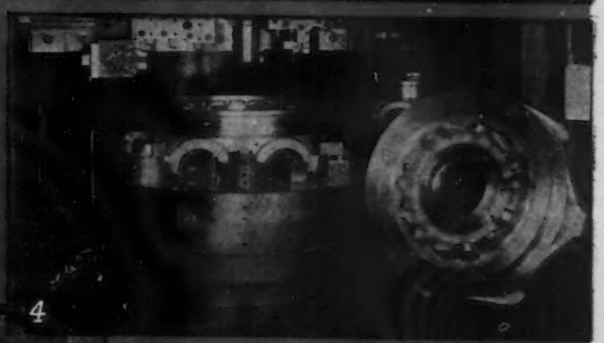

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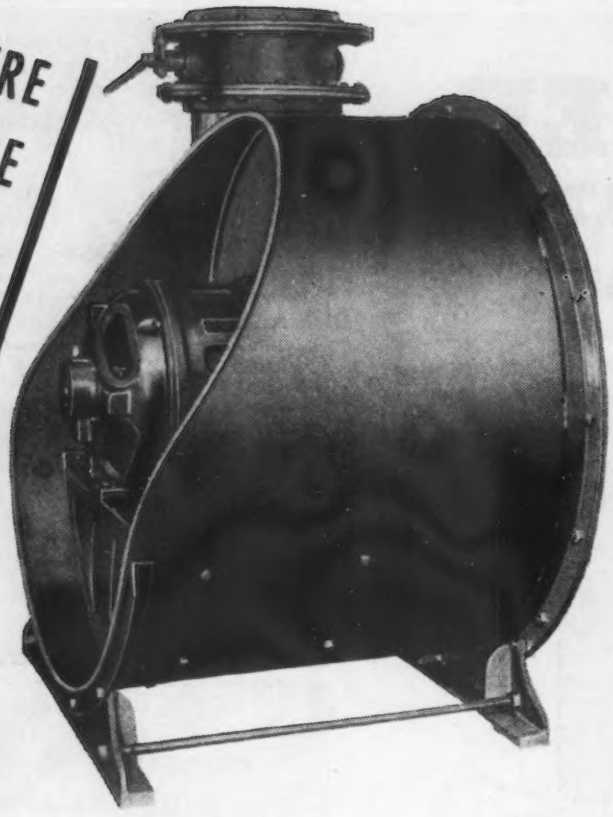

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TURBO-COMPRESSORS

Newspapers Are Urged To Intensify Coverage Of Scientific Progress

• • • **Public interest in science,** spurred by the miracles of war research and the promise of great peacetime benefits, is challenging the nation's press to cover the scientific front in all its developments, members of the American Association for the Advancement of Science were told recently.

G. Edward Pendray

"The hunger of the man on the street for news of scientific progress has increased in step with the penetration of technical advances into his daily life," declared G. Edward Pendray, assistant to president of the Westinghouse Electric & Mfg. Co. "It should be the continued aim of all newspapers, the nation's greatest single educating force, to satisfy that hunger."

Mr. Pendray spoke at a symposium arranged by the National Association of Science Writers in commemoration of its 10th anniversary. Other speakers were Louis B. Seltzer, editor of the Cleveland "Press," Martin J. Porter, editor of "The American Weekly," and Dr. Morris Fishbein, editor of the "Journal of the American Medical Association." David Dietz, science editor of the Scripps-Howard newspapers, presided as chairman.

The last three or four years, Mr. Pendray said, have witnessed an unprecedented spread of technical knowledge among the American people.

"Not only has this education been provided to men of the armed services in the classrooms of half a thousand colleges," he asserted, "but it has also been taught as part of the basic training of hundreds of thousands of men assigned to particular technical tasks. It has been learned in the battlefield, too, when crises made an understanding of rocket power or radio or ballistics a matter sometimes of life and death.

"The phenomenal growth of industrial research," Mr. Pendray declared, "has brought science into the everyday lives of all of us. In 1920 there

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Spraying the interior of a freight car or truck with dry ice is being tried as an inexpensive method of refrigeration.

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Serious consideration is being given to the making of illuminating gas near the coal mines and its delivery by pipe line.

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Cigarette paper, formerly a French monopoly, is now being successfully made in this country.

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A capsule has been developed that is said to be effective in the prevention of seasickness in about 75% of the cases tested.

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Cloth is being made from shredded redwood bark mixed with wool.

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Experiments are being made to determine the suitability of animal blood for human transfusion.

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Shafts for generators are now being squeezed into shape with dies.

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A new plant processes 25,000 pounds of milkweed floss per day.

Shoal draft boats with tunnel sterns are made more efficient by the use of a small stand-pipe over the propeller which is kept full of water by a vacuum pump. The propeller is thus constantly surrounded by water although above the water level.

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Anthropology is not popularly thought of as a commercially useful science, but anthropologists were consulted in designing seats for aircraft, gas masks, and goggles, and they might well be turned loose on the problems of private and public furniture after the war.

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Airplane propellers are now being made of sponge rubber over a metal core.

Apparatus now in use by our army is expected to make it possible for civilians to forecast weather accurately as much as 24 hours ahead.

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One of the country's largest chemical companies states that 46% of its gross sales for last year consisted of products unheard of fifteen years ago.

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Rayon is being used for tire cord, parachutes, paint brushes, pump packing, bullet-proof gas tanks, lint-free gloves, electrical insulation, gas-proof clothing, cartridge bags, felt, and rugs.

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Optimistic producers of synthetic rubber say that, in the future, people will buy new automobiles to go with their old tires.

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Ball bearings are now being made small enough to replace the jewels used in many precision instruments.

Tomorrow's production should eliminate second operations

The 8-Spindle Conomatic produces these wheel hub bolts from SAE 1030 in 34 seconds each. Slot milling in the large diameter and stamping the letter on the end are done without stopping the spindle. Conomatics reduce costs, save time, and eliminate second operations.

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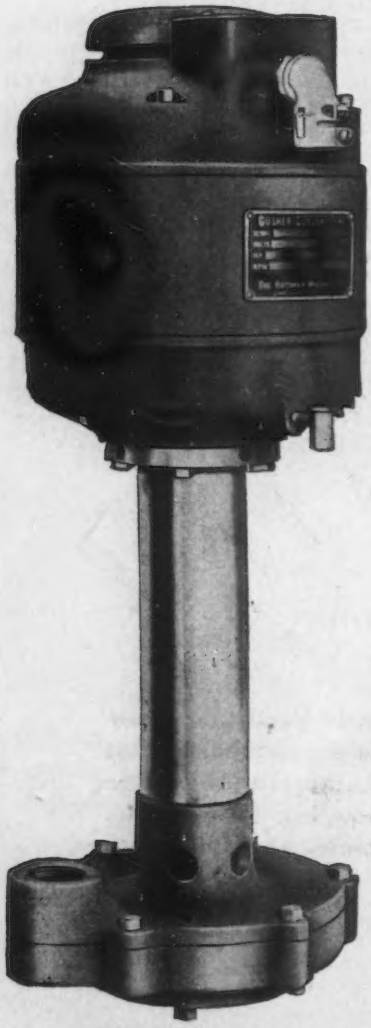

One of the big advantages of Gusher Pumps, besides their simple design and rugged construction, is their flexibility of use, giving anything from 200 gallons per minute to the tiniest trickle since they can be throttled (according to type and size) to produce any desired flow *without injury to the pump and without overloading motor.*

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See Section 2 of new catalogue indexed for quick reference.

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THE "GUSHER"—A MODERN PUMP FOR MODERN MACHINE TOOLS

were only 297 industrial research laboratories in this country, employing about 7400 research men. Twenty years later, 2350 companies had laboratories, employing a total of 70,000 men."

The fruits of research, study and experience are not only now helping to win the war, but will very definitely affect the living conditions and habits of people in the peacetime era, he added.

In reporting fully the progress of science, Mr. Pendray said, the newspapers are cooperating in an educational task of the first magnitude.

"Our high schools, colleges and universities are rapidly becoming aware of the importance of widespread technical education, and they are restudying and re-evaluating their standards accordingly. All over the country, in the postwar years, there will probably appear science and technical institutions capable of giving a large section of our population at least some training in this field."

For that large group of Americans whose formal education is completed, Mr. Pendray declared, the radio and motion pictures are already supplementing the work of newspapers in making science intelligible and interesting. Industrial companies, producing scientific and technical motion pictures of their own, find an ample audience.

"Science and technology are destined to shape the future of our affairs," he said. "The day of the trained science writer, capable of translating the progress of scientific research into the language of the average man, has arrived."

Ordnance Award Goes To Battelle Memorial Institute

Columbus, Ohio

• • • **In recognition of** outstanding contributions to ordnance progress, the War Department presented Battelle Institute, Columbus, Ohio, the Ordnance Distinguished Service Award at a presentation ceremony held at Battelle recently.

Citing the Institute's research on the substitution and conservation of materials, armor and gun steels, light metals, welding and numerous other projects, Maj. Gen. C. T. Harris, Jr., Commanding General of the Aberdeen Proving Ground, presented the award on behalf of the War Department. Clyde Williams, director of Battelle, received the citation on behalf of the Battelle staff.

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Machines and machine tools as well as men must measure up to MARINE CORPS standards before acceptance . . . must be capable of handling whatever situation arises. That is why we are proud that SHELDON LATHES were selected for the Marine Trailerized Machine Shops as well as for the Army's "Mobile Machine Shop and Mobilized" Instrument Repair Shop Units, and as the maintenance lathes for many Navy craft.

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Westinghouse Sends Engineer to South American Countries

Pittsburgh

• • • A leading American research engineer has arrived in South America to help co-ordinate inter-American industry through science, it was announced recently by John W. White, president of the Westinghouse Electric International Co.

The engineer is Dr. Peter L. Bellaschi, of the company's Sharon, Pa., laboratories.

Arrival of Dr. Bellaschi in Buenos Aires, Mr. White said, represents the start of a "give and take" tour in which he will study Latin America's expanding electrical needs and inform leading South American industrialists, technical research men and educators of recent scientific developments in the United States.

Dr. Bellaschi, inventor, author and an authority on electrical insulation, will visit Argentina, Peru, Brazil, Uruguay, Chile, Colombia and Venezuela.

Recognized for his ability in the engineering profession and for his contributions in that field, Dr. Bellaschi will make a close study of South American electrical apparatus and its applications, the climatic conditions under which it operates and of South American standards in the electrical field. Standards, the reference values for temperature, barometric pressure, humidity and altitude have long been patterned in South America after those of European nations, but since the war have shown a definite trend toward the United States system.

In addition, Dr. Bellaschi, who is a linguist and a student of international affairs, will lecture before various South American groups, including young engineers in technical schools and universities.

"Both friendship and self-interest demand that the United States give its dollars and technical skill in helping Latin America industrialize," Mr. White said. "Latin America's great natural resources are as yet virtually untapped and must be extracted, processed, fabricated and sold, if its nations are to realize their rich heritage. I dismiss as shortsighted those who see in the industrialization of Latin America a threat to our own well-being and foreign trade. This industrialization will mark her end as a market for some of our manufactured goods," he declared, "but the in-

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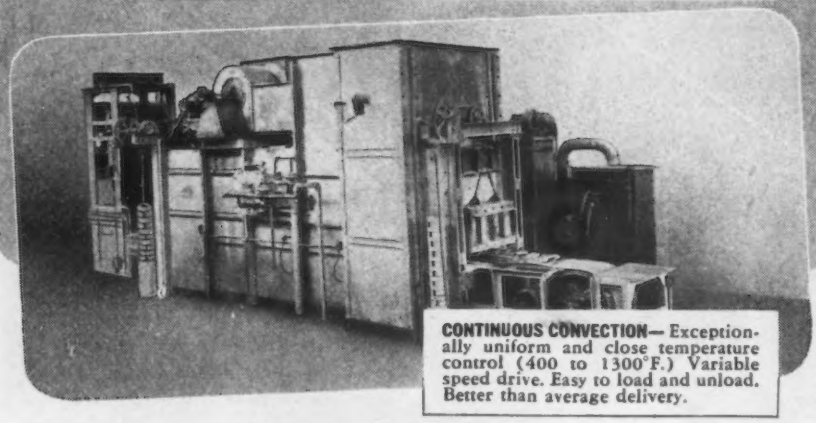
CONTINUOUS BRIGHT ANNEALING— Equipped with woven wire belt, cooling chamber, atmosphere unit and variable speed drive for heat treating stampings.



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BUY WAR BONDS

evitable increase in her buying power will offset this loss many times. Through Dr. Bellaschi's 'give and take' tour we expect to gain increased knowledge of South American engineering standards and designs so that this market may better be served after the war. We hope to give South America a better knowledge of American engineering designs and manufacturing procedures and to acquaint the Latin American countries with our products," Mr. White continued.

"Through this we feel that development of postwar markets will be furthered with resultant improvement in the postwar employment outlook at home."

Industrialization In Chile Will Include Initial Steel Mill

Schenectady

• • • **An electrification program** is now taking place in Chile to speed industrialization there, and contracts have been awarded to the International General Electric Co. to supply generating, transmission and distributing equipment. The electrification program will be followed by the development of that country's first steel mill, as well as coal mines, and textile mills.

Three plants have already been scheduled for production by the Corporación de Fomento de la Producción, the Chilean government agency in charge of the development, and more are planned for the near future.

The hydroelectric plant at Abanico, the newest development, is to produce an ultimate capacity of 130,000 kva., about one-fourth the present capacity of the Bonneville hydroelectric in this country. Projected output of the steel mill is more than 100,000 tons per year.

Continental Acquires Quality

Chicago

• • • **Continental Industries, Inc.,** New York, has acquired Quality Hardware & Machine Corp., for many years active in the production of stamping and forging dies, jigs fixtures and metal stampings. After the war, the firm plans to invade the household appliance field, an activity whose inception was delayed by the start of the war. Quality Hardware continues to be active in the manufacture of ordnance items, although its West Fullerton and South LaSalle Street plants have been closed.

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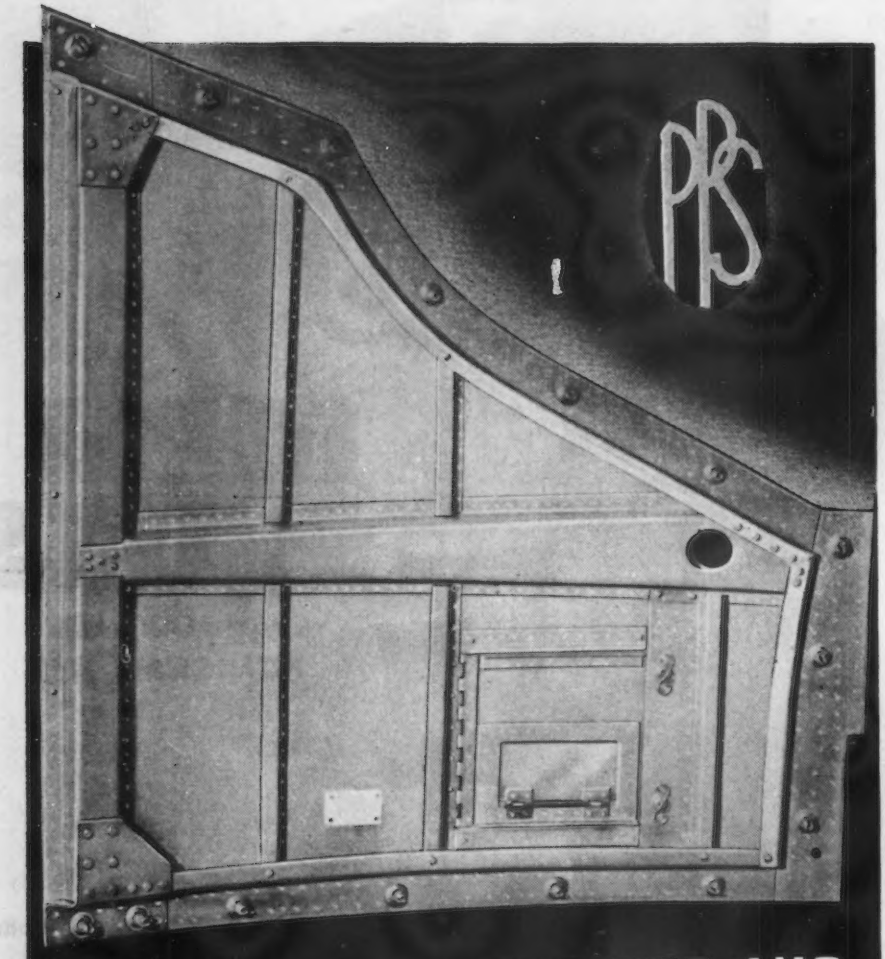

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Rigid adherence to specifications, speed of production and low cost feature Parish Aluminum Stampings. From preliminary design to finished assembly, every detail is handled in the Parish plant. Discuss your parts and assembly requirements with Parish engineers to determine how metal stampings may help you achieve greater production at lower costs.

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Western Representative: F. Somers Peterson, 57 California St., San Francisco, Calif.

New Amphibian Tank Now in Use in Navy Pacific Operations

Kalamazoo, Mich.

• • • Recently the latest vehicle in the U. S. Navy's amphibian tank program was demonstrated on land and in the water.

Although discussion of its details is restricted, more than 125 suppliers of parts for the improved amphibian tank were permitted to witness the landing craft in action.

With Navy officials accompanying them the visitors toured assembly lines and proving grounds, where a fleet of amphibians was put through its paces over difficult obstacles.

A unique situation was revealed in the plant where hundreds of men and women employees are producing the "boats." Here, it was explained by R. S. Ingersoll, works manager, the offer of free rides on completed tanks is proving an attractive spur toward perfect attendance records.

In a talk prepared for delivery, Ingersoll sketched the story of how his concern, which produced spring harrow and rake teeth, discs, and other agricultural parts before the war, has grown since 1941 into one of America's important manufacturers of amphibian tanks.

It has manufactured both the LVT-1 and LVT-2 models since the summer of 1941, as well as designing and developing the new amphibian vehicle desired by the Navy, he said.

Battle grounds in the Pacific—the Solomons, Tarawa, Bougainville, Guadalcanal, and New Britain among others, have witnessed the operations of the amphibian tractor.

Said the Navy in a release from Washington: "It was on the beach of Tarawa that the amphibian tractor, which in many a previous assault on enemy territory had proved a particularly formidable member of the Navy's landing craft fleet, demonstrated that for getting our invasion forces ashore on the coral-bristling atolls of the mid-Pacific it is absolutely without equal. . . .

"Equally at home on land or sea, the amphibian tractor established its reputation in the initial landings in the Solomons when it churned its way ashore in clouds of spray, clanked back ond forth on the beach amidst bursting shells, tirelessly hauling men, guns, ammunition and evacuating wounded."

In 1942 and 1943 the company built and shipped LVT-1's on contract, he

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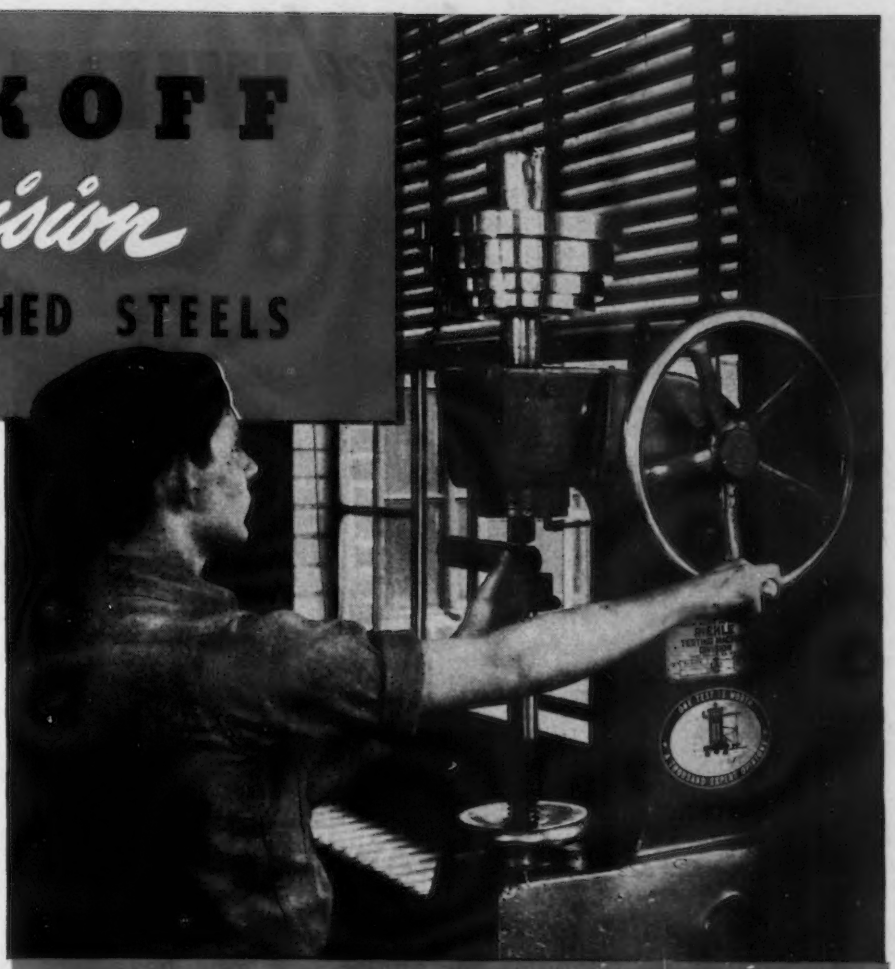

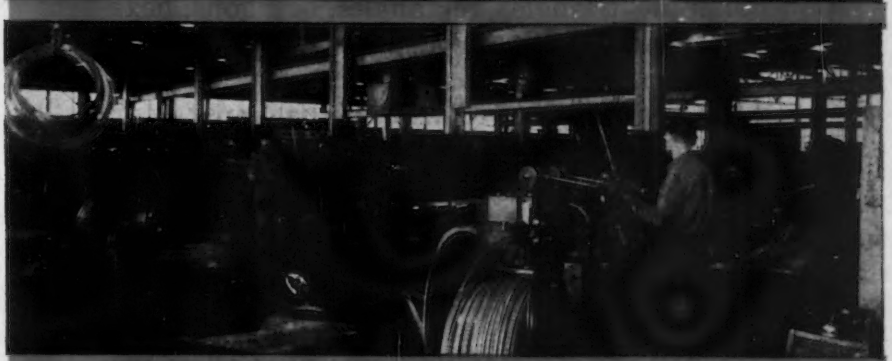

Wyckoff Heat Treated, Cold Finished Bars give steel fabricators a more dependable, easier working steel, having more uniform grain structure, greater strength and ductility. No heat treatment after machining is necessary thus saving costly heat treating, straightening and cleaning operation time.

Wyckoff metallurgists will be glad to work with you, now, on your post-war cost reducing planning.

ARMY E NAVY

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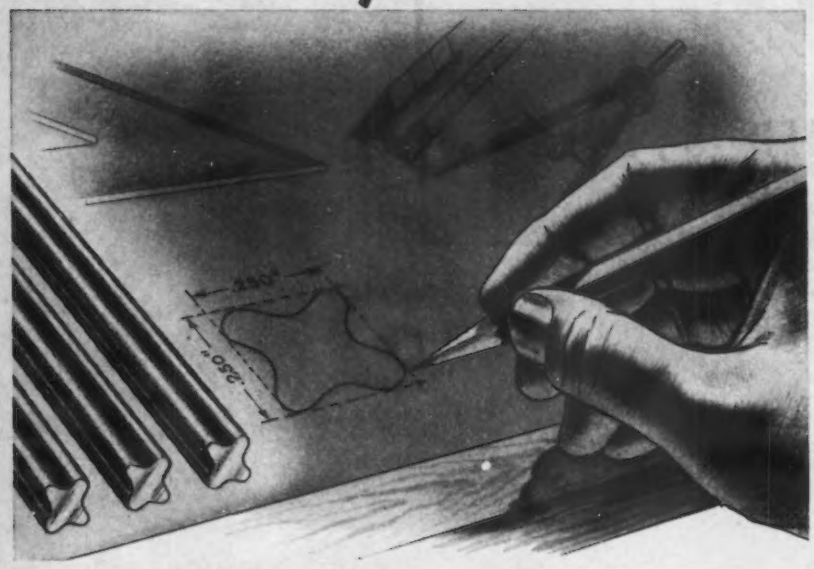
PAGE *Shaped* WIRE



YOU DRAW THE *SHAPE* . . .
PAGE CAN DRAW THE *WIRE*

Certainly **PAGE** is now drawing wire in many shapes—triangles, rectangles, octagons, hexagons, keystones, ovals, half-rounds, many other hard-to-describe special shapes. If you have use for shaped wire in the manufacture of your product, you are not limited to standard shapes. You draw the *shape*—**PAGE** can draw the *wire*.

Yes, and **PAGE** will go further than that. From years of experience, **PAGE** has learned much about the economical application of shaped wire to manufacture. **PAGE** offers you the benefit of this experience in finding ways to cut your production costs through the use of shaped wire.

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Specifically, PAGE Shaped Wire is made in sectional areas to .250″ square—widths to ⅝″—of carbon or stainless steels.

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BRIDGEPORT • CONNECTICUT

revealed. And in April of this year completed a contract to build the improved LVT-2 on the design furnished by the Navy.

The contract for production of the present Borg-Warner amphibian tank was let in October, 1943. The work of designing for production already had been started by Ingersoll and production began in May of this year.

National Income Is At Highest Figure

New York

• • • **The national income** produced in the United States rose in July to the highest monthly figure this year, according to the Alexander Hamilton Institute. The increase over the June level, however, was slight and, as compared with a year ago, the national income in July showed a decrease. The national income in July amounted to $12,278,000,000 as compared with $12,171,000,000 in June and with $12,363,000,000 in July last year.

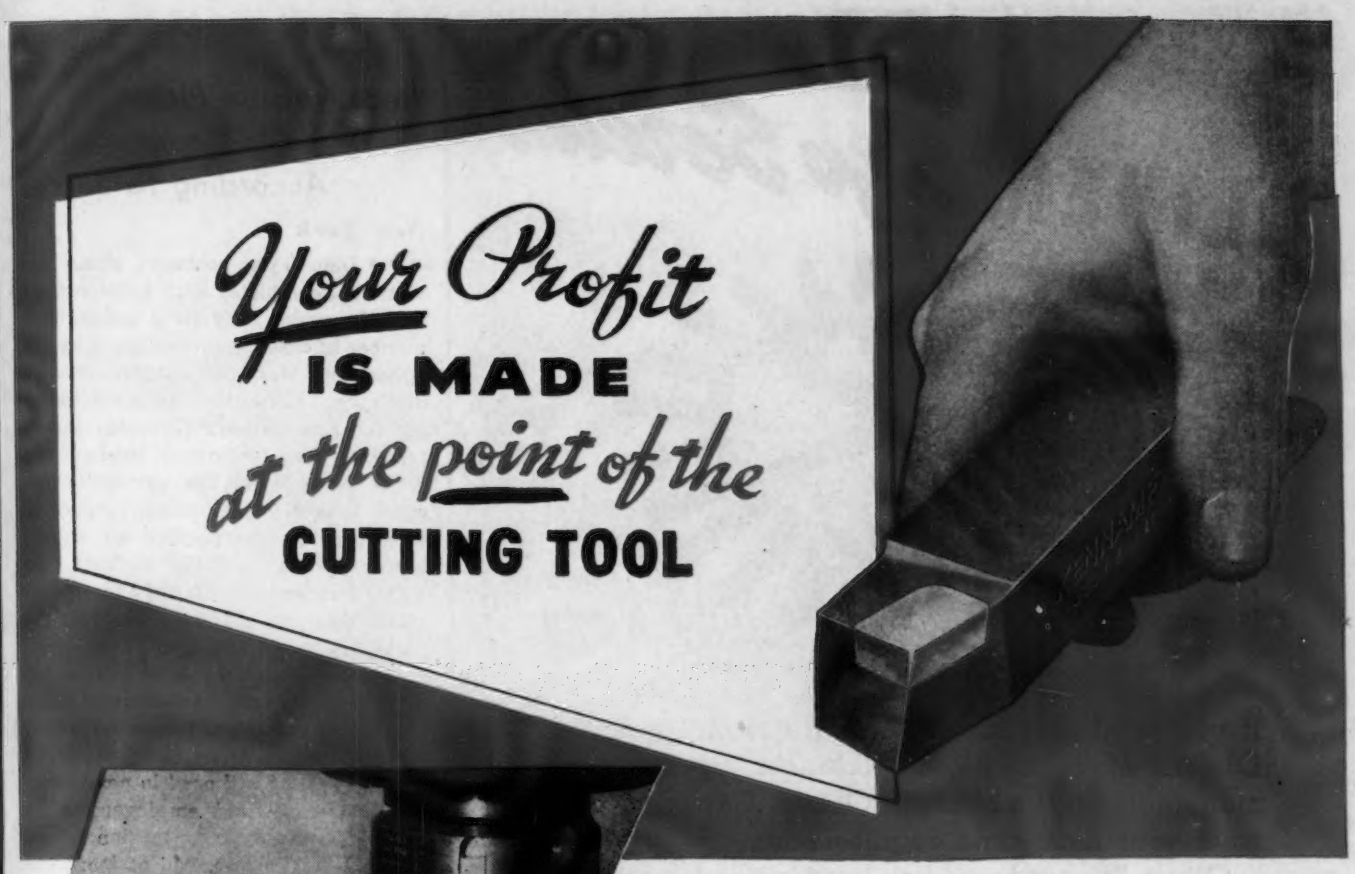
Although the national income in July was smaller than in the same month last year, the decrease was more than offset by gains in preceding months. For the first seven months, the national income amounted to $84,810,000,000 this year as against $82,154,000,000 last year, an increase of 3.2 per cent.

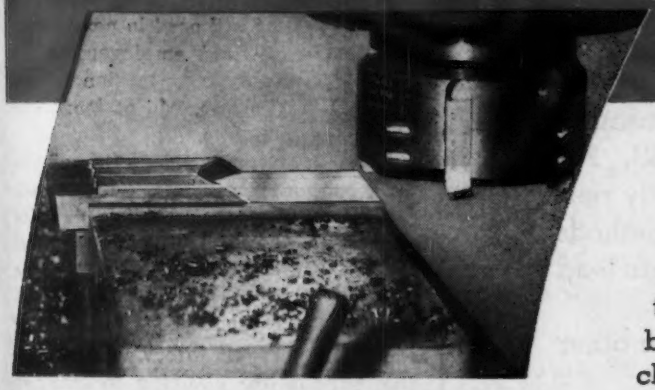
Preliminary information indicates that the moderate upward trend in the national income, which began in May, was extended in August and September. The prospect is, however, that this movement will reach a peak in October and will give way to a decline in November and December.

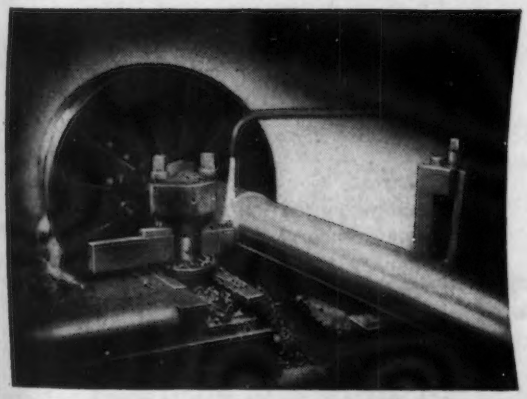
It is possible that the national income during the last half of 1944 will be somewhat smaller than during the last half of 1943. The small increase over a year ago during the first half of this year may thus be offset by a decrease in the last half. This will be the first year since the war began in which the national income has failed to show a sharp expansion over the preceding year.

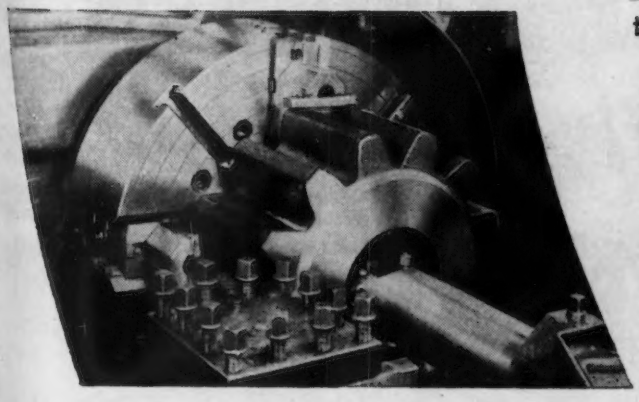
Nevertheless, the national income this year will be large if it only equals last year's figure. Last year, the national income was the highest on record, having risen to $147,927,000,000 from $121,568,000,000 in the preceding year, from $64,200,000,000 in the prewar year of 1938 and from $39,963,000,000 at the bottom of the depression in 1932.

Your Profit IS MADE *at the point of the* CUTTING TOOL









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Thus, Kennametal—in common with other inventions that have been brought forth under the American system of free enterprise—returns profit, not just to its inventor, nor only to the industries in which it functions, but . . . chiefly to all our people.

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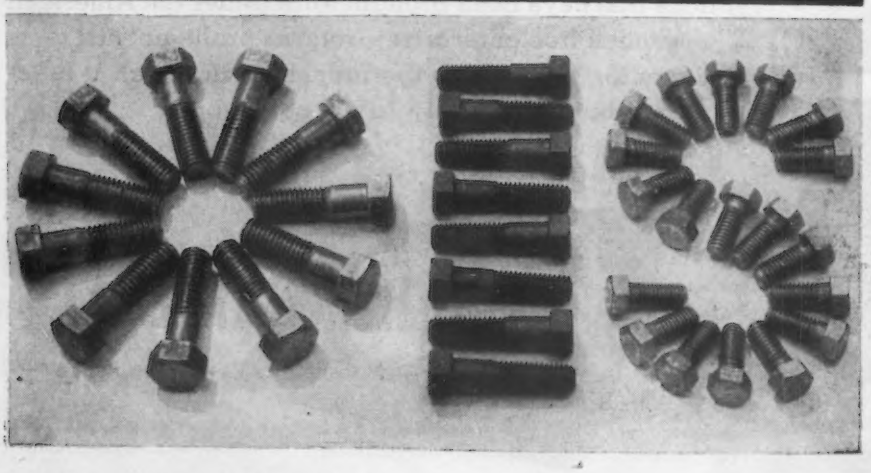
MAKERS OF POLE LINE MATERIALS SINCE 1894



Reconversion Plans Virtually Completed According to Survey

New York

• • • **Industry's postwar plans** are virtually complete, with reconversion already under way in a substantial number of cases, a survey made by the American Management Association discloses. Conducted in preparation for the Association's three-day industrial relations conference, held recently in New York, the survey covers more than 300 companies, largely in war work and employing an aggregate of nearly 1,000,000 workers.

One hundred and fifty of those firms state that no reconversion will be necessary, while 122 declare only moderate retooling will be required. A large majority, 273, have definite plans for the resumption of peacetime activities, while 226 know the number of employees they will need in peacetime, and 144 have told employees what their plans are. Reconversion is under way in 87 cases, and at least one is already complete.

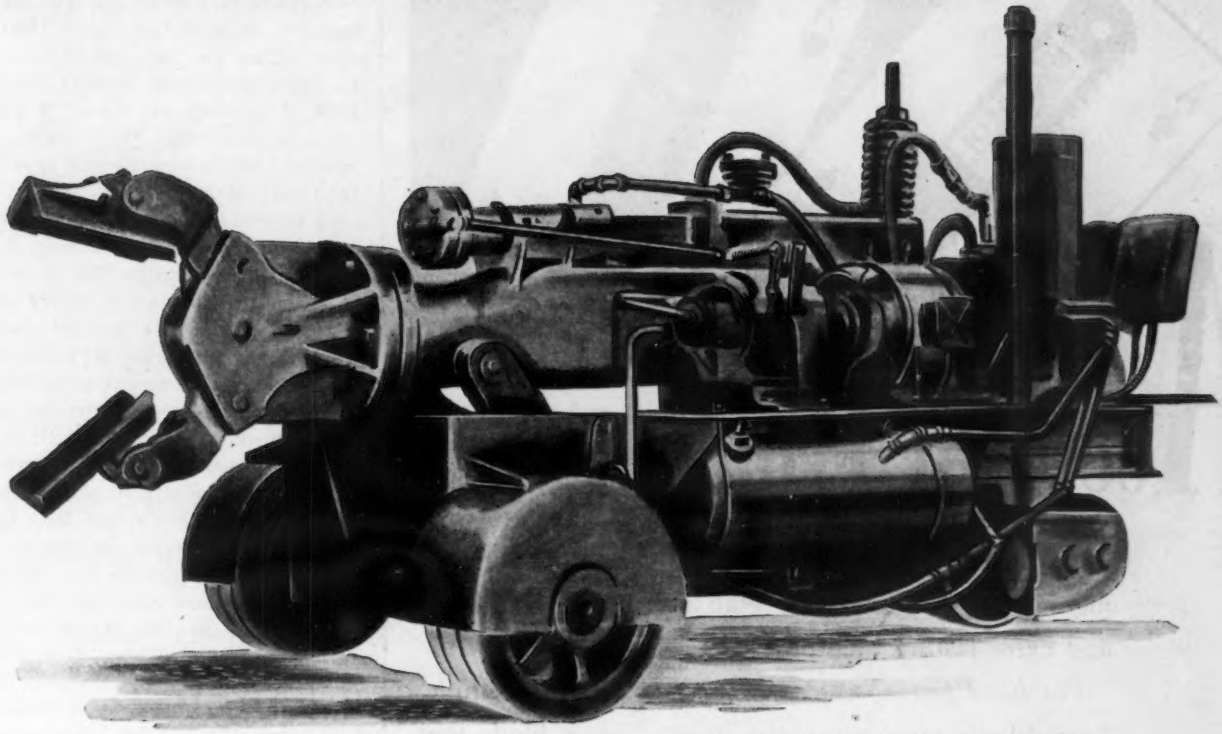
One hundred and eighty-four of the firms contemplating layoffs due to cutbacks or reconversion have definite plans for attempting to place laid-off employees elsewhere, and 69 of these are planning vocational guidance programs, while 230 expect to conduct some form of exit interview. A sizable portion are planning to stagger layoffs in order to cushion employment problems.

"In general, however, layoffs will not be so extensive as these returns would seem to indicate," Guy B. Arthur, Personnel Director, American Thread Company, who presented a summary of survey returns to the conference, pointed out. "The companies surveyed are mainly those in war work and all but 25 are in manufacturing, producers goods for the most part. Even the most optimistic postwar planning has taken into account a contraction in heavy-industry employment, believing it will be offset by expansion in the distribution and service fields."

Results of the survey bear out the last expectation, since many of the civilian goods companies are now employing fewer workers than they were before the war, and a number contemplate expansion as soon as they can fill their depleted employment rolls. Significantly too, most of the "war babies" which give actual figures indicate that they plan to employ more

The "PINCER MOVEMENT" with the MOTHER'S TOUCH

executed with the help of HELE-SHAW FLUID POWER

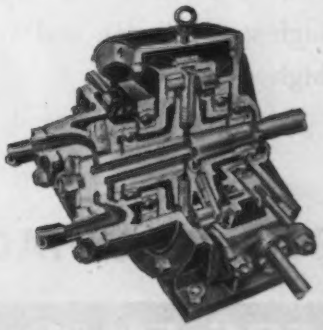


Machines like this have a big job . . . handling 2,000 to 20,000 lb. ingots in and out of furnaces, and holding them under forging hammers.

It's a mobile Auto Floor Manipulator, designed and built by Edgar E. Brosius, Inc. The business end rotates, raises and lowers; the powerful jaws open and close. These movements are energized by Hele-Shaw Fluid Power; that is, oil under pressure, from a Hele-Shaw Pump. Hydraulic operation eliminates individual motors, makes a compact machine. Tremendous sustaining pressure on the tongs prevents the billet from dropping, yet the billet can be manipulated as tenderly as a mother handles a new born baby.

Among your machines or equipment for future release may be operations such as pulling, pushing, stretching, squeezing, lifting, tilting, or many others, which Hele-Shaw hydraulic engineers can improve. Find out now while there's time to plan.

THE
Hele-Shaw
Fluid Power Pump



OTHER A-E-CO PRODUCTS: TAYLOR STOKERS, MARINE DECK AUXILIARIES, LO-HED HOISTS

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Blu-Mol Hack Saw Blades by Millers Falls have won many a production battle with their extra toughness and extra lasting qualities.

For hand sawing the nine types of Blu-Mol Single-Edge Blades meet every requirement for a blade that can "take it."

For extra-heavy duty, continuous-production power sawing, the six sizes, embracing a total of 24 types, meet every demand for a blade that will cut the toughest steel.

Double Life — ¼ Lower Cost

Under proper supervision of cutting conditions, nothing can equal the now famous BLU-MOL DOUBLE-LIFE blade for low hack-sawing costs. With its two cutting edges, it costs 25% less than two molybdenum high-speed blades, and 47½% less than two tungsten high-speed blades.

For every sawing need, specify Millers Falls blades.

BLU-MOL HACK SAW BLADES

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SINCE 1868

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people than they did before the war, even though their total employment will be below their wartime peaks.

A manufacturer of printing machinery, for instance, employed 1500 persons before the war and is now down to 1350, but would employ "1500 or 1600, if we could get them." A hosiery manufacturer with 850 employees as against 1400 before the war expects to take care of its 250 men now in military service and hire workers released from other war plants as well. A utility company, down to 7500 employees from the pre-war figure of over 10,000, believes it can take care of its 2300 workers now in the armed forces without discharging present personnel.

Even some of the companies which have enormously expanded their employment rolls anticipate no trouble. A metal products company enlarged by 62½ per cent writes that it expects "some increase in the present force"; a fire insurance firm with 500 employees before the war, 550 now, and 88 men in the armed services, anticipates no problem; a petroleum company in which employment is up to 14,270 from 12,500, with 3000 men in service, believes that by reducing the workweek it will be able to employ returning service men without laying off any of the present personnel; a rayon manufacturer with 1272 employees before the war and 2163 at present expects to expand to a top of 3600.

"All together," Mr. Arthur said. "some 30 or 40 companies contemplate expansion or retention of their present working forces, together with reemployment of veterans; and this, considering how heavily weighted the group surveyed was with 'war babies' presents an encouraging picture. An electronics firm, for instance, had only six employees in pre-war days and now expects to keep two-thirds of its present force of over a thousand, a clear gain of several hundred in the number of jobs available.

Answers to questions about veterans indicate that all companies are planning to observe the letter of the law in giving reemployment, and that a majority will try to go beyond their legal obligations. "We feel fully responsible for returning veterans who left our employ to go directly into the armed forces and will do everything possible to help them in every way. While positions are open, we will try to employ discharged men with no previous experience with this company," a typical answer read.

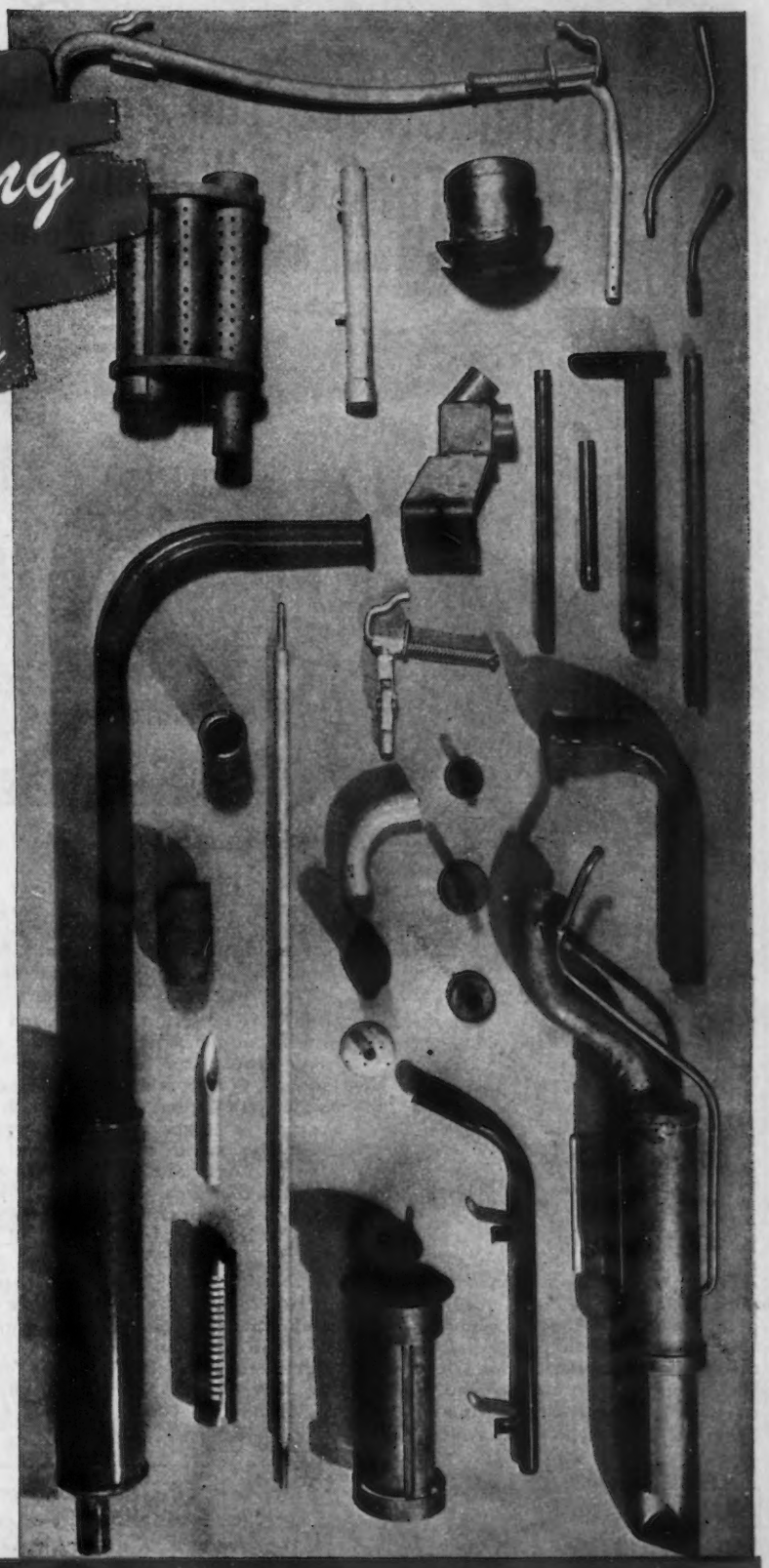
Toward disabled veterans, too, industry feels considerable responsibil-

A FEW TYPICAL

Metal Tubing

AND STAMPING

Assemblies



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This picture shows only a few of many different kinds of metal tubing and stamping assemblies—fabricated by Noblitt-Sparks—to go into the products of other manufacturers. But this may suggest something that our company might make for your company—now or later—to your advantage as well as ours.

Noblitt-Sparks makes and forms metal tubing into any shape—welds it to other parts stamped from metal — assembles, plates or paints the entire unit—ready to go into your product.

With 11 plants and 25 years of experience in manufacturing, Noblitt-Sparks may have exactly what you need in engineering assistance and production facilities. When you have a specific job in mind, write or call . . .

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NOBLITT-SPARKS INDUSTRIES, INC. • COLUMBUS, IND.

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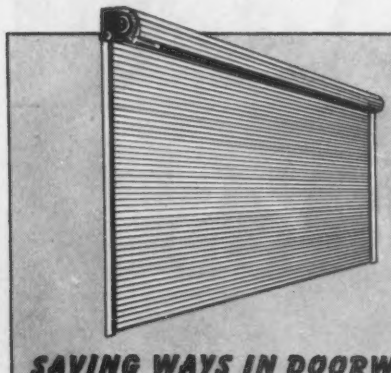
FABRICATORS OF METAL TUBING AND STAMPING ASSEMBLIES TO MEET YOUR NEEDS

LIGHTNING STARTS FIRE; FLAMES LEVEL SECTION OF WAREHOUSE

Kinnear Doors Save Adjoining Buildings

"A terrific bolt of lightning struck one of the fire walls in Section "E" of our Plant, completely demolishing approximately 50' of the firewall and setting a flash fire in the cotton on both sides of the demolished firewall dividing Section "E" into two compartments. It was a roaring inferno in just a few minutes. We were particularly impressed with the excellent performance of your doors in this Plant. The fusible links promptly melted, the doors dropped, protecting the adjacent Sections and, although the fire roared for two days, the large doors and the small doors exposed to this terrific heat held perfectly. As a result, the fire loss was comparatively small as it was confined to the one Section struck by lightning."

Another typical performance by Kinnear "Akbar" Steel Rolling Fire Doors! They remain coiled overhead until fire strikes, then their positive, automatic closing action seals openings with a curtain of steel. For safety to building occupants, a special device controls the downward speed of the doors—which can also be raised by hand after automatic closure. Approved and labeled by Underwriters' Laboratories, they have saved as much as 33% of their total cost annually in reduced insurance rates. Kinnear "Akbar" Rolling Fire Doors are built any size, to fit any type of opening.



For fast, efficient door service . . . for fire protection . . . *or for both* —there's a Kinnear interlocking steel slat door to fill the need! These famous doors are *proved by performance* to offer longer-lasting convenience at lower cost. Write for details. The Kinnear Mfg. Company, 1860-80 Fields Ave., Columbus 16, Ohio.

SAVING WAYS IN DOORWAYS

KINNEAR
ROLLING DOORS

ity. Most companies are planning to employ all their own men who return disabled, and at least nine hope to hire every disabled veteran who applies, while 152 noted that they would consider such a policy.

Where layoffs are necessary, seniority will prevail for the most part, tempered by considerations of merit or special provisions of the union agreement. One hundred and seventy of the companies have already prepared their layoff policies.

There is evidence also that many of the firms hope that a larger part of the layoffs can be made among housewives and others who have joined the labor force only for the duration of the war and would retire anyway. Many of the companies mentioned this factor, and 153 plan to "reconvert" to skilled work jobs which have been simplified so that untrained women can handle them.

A number of the other changes which have come with the war will be retained, however, notably labor-management committees and the institution of employee counseling. Of 133 firms having the committees, 91 plan to keep them, while only 19 of 205 companies which have introduced employee counseling will discontinue it.

Nash-Kelvinator's Helicopter Program Sees First Flights

Detroit

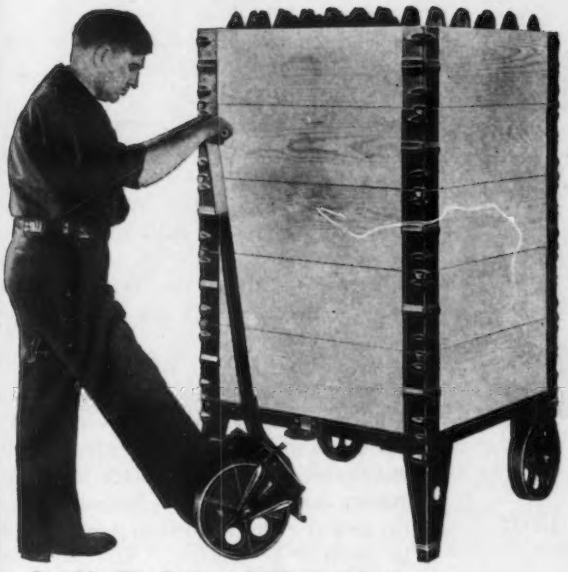
• • • **The first helicopter** to be built by Nash-Kelvinator Corp. by the Army Air Forces has completed flight tests over Detroit. Application of automotive assembly line techniques to the production of this type of aircraft is now under way, George W. Mason, president of the company announced recently.

Reporting improvement over earlier models, Mason said the new version of the Sikorsky design being built by the company differs from models existing at the time contracts for the new aircraft were signed. "Progress has been made in the simplification of controls and improved designs during the process of converting early helicopter blueprints into production," Mason said.

The R-6 helicopter, a joint Army-Navy development, is a two-place dual control machine, with a single three-bladed rotor, and an anti-torque propeller on the tail. It is said to have a 100-mile per hr. top speed and a five-hour range, powered with a 245 hp. Franklin engine.

When "KEEN COMPETITION" comes where will THE AXE FALL IN YOUR PLANT

ON Profits OR ? ON Costs



Portable Bin Sections build or reduce vertical extension as needed.

Let the TURNER SYSTEM OF MATERIALS HANDLING *Cut Your Production Costs!*

Some manufacturers are going to get a pretty tough shock when they get into postwar competition. Industry will have to pay its own way . . . "or else!" Forward-looking manufacturers realize that now — and are preparing for it.

Portable Slide Shelf Rack, may be transported with Jimmy.

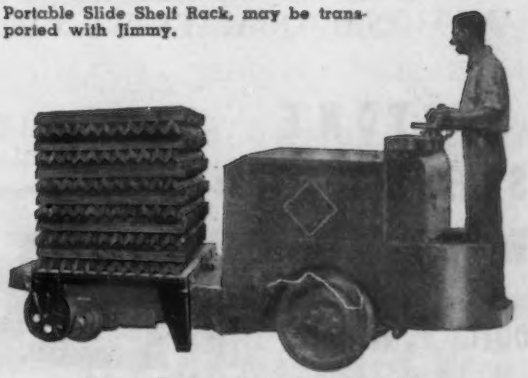
Turner Shop Boxes in Shop Box Racks, mounted on Turner Transport.

"Is YOUR House in Order?"

The "Turner System" can help you put it in order — in a hurry. It offers an unbeatable combination for saving time and space . . . makes every minute and every cubic foot count. Labor savings are exceptional.

You May Have a Complete Outline Without Obligation

The whole story of the "Turner System" is presented in a twenty-page book, sent without charge to established companies. Send for your copy today!



Turner Equipment used with mobile power units.

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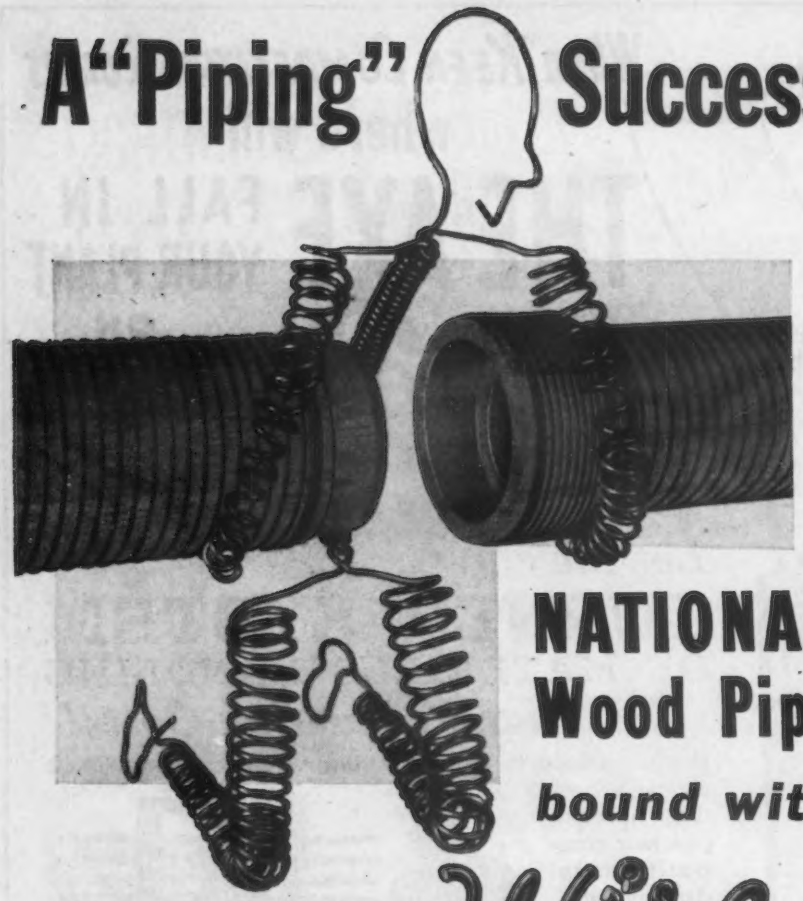

NATIONAL Wood Pipe* bound with KEYSTONE Wire

NATIONAL QUALITY Wood Pipe "carries the water" today in many army camps, irrigation projects and municipal water systems.

The strength and long-lasting qualities of NATIONAL Wood Pipe are assured by the specially-treated wood and heavily galvanized Keystone wire, plus an outside coating of coal tar and pitch.

Again, we are pleased that Keystone Pipe-Winding wire fulfills this important role in the manufacture of NATIONAL QUALITY Wood Pipe.

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Coppered, Tinned, Annealed, Galvanized

Shipping Shortage Will Delay Return Of Men Now in Europe

New York

• • • **Forseeing that** a transportation shortage will prevent the prompt return of service men from Europe when hostilities there cease, the War Department is planning various educational programs for the convenience of men awaiting transportation, Col. Lawrence Westbrook, assistant director of the department's planning division disclosed recently at the meeting of the American Management Association held here.

The educational courses, he said, "will likely be supplemented by organized travel tours for interested service people. The cessation of the war against Germany, moving us into the Japanese phase of the war will put an even greater strain on our shipping facilities, making it necessary for most of the men no longer needed in Europe to remain, even though they are not required for the Army of Occupation."

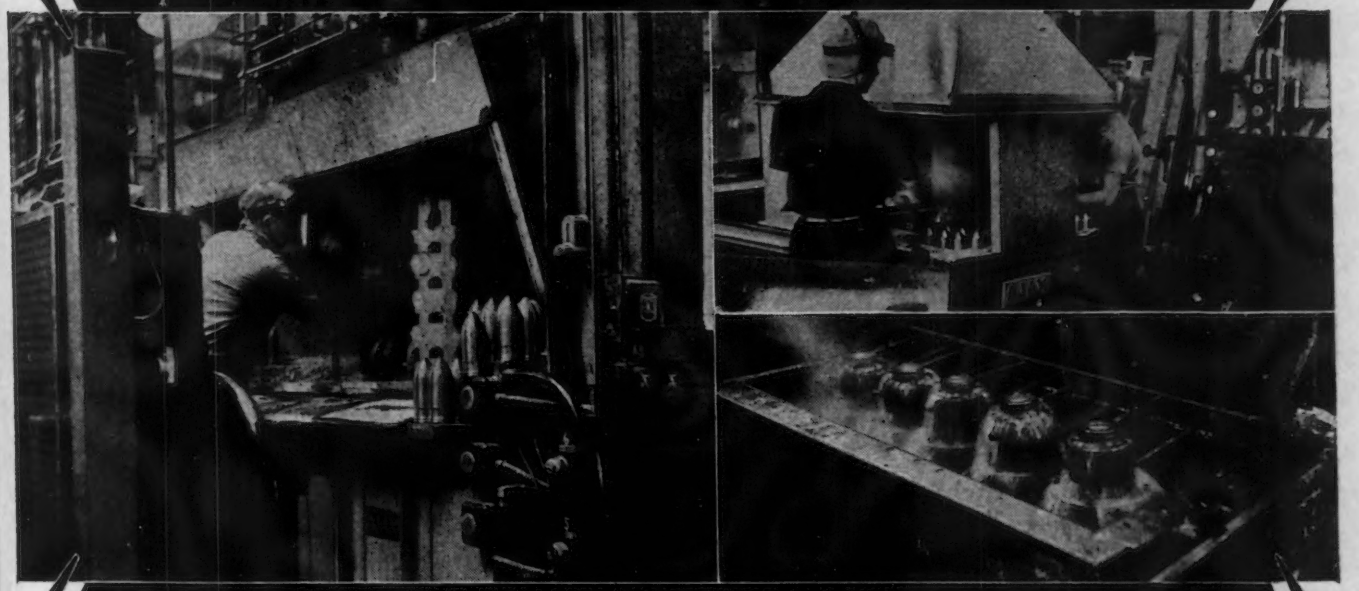
According to Paul V. McNutt, chairman of the War Manpower Commission, the abandonment of government materials and manpower controls upon victory in Europe will place upon industry management the responsibility for piloting the American people back to civilian production. His address was presented by Lawrence A. Appley, former deputy chairman of the WMC, when he was unable to attend because of an attack of laryngitis. Promising that the WMC would continue to serve management and labor after V-E Day in major functions of a non-regulatory type, he said that manpower controls, except in a few areas, would end.

Recalling that on a previous occasion he had virtually challenged industry to achieve new production goals with fewer workers, Maj. Gen. Lewis B. Hershey, director of Selective Service told the meeting that he now offered industry the challenge of "taking back all the men we've taken away from you."

His organization, "charged with providing the maximum aid to soldiers in getting replaced in industry, would consider it the ultimate if you could put us out of a job by providing more jobs than there are men," he declared. "We'd love to be done out of a job that way."

It was estimated by Dr. William Haber, director of planning for the WMC, that 7,500,000 workers will be

"An Integrated Combination of Mechanical, Electrical and Metallurgical Engineering"



This Installation Reflects the Type of Service Available When You Use These AJAX SALT BATH FURNACES

A most important reason why more Ajax Salt Bath Furnaces are in use than all other electric makes combined is seen in this statement by B. A. Briton, Vice President, Continental Die Casting Corporation:

". . . the engineering behind the mechanized electric salt bath furnaces for our stringent armor piercing shot job has proved itself accurate and reliable in every respect.

"Involved here was an integrated combination of mechanical, electrical and metallurgical engineering, the failure in any one of which would have meant the failure of the whole job.

"These Ajax units have been in operation almost two years now, during which time we have turned out millions of accurately heat treated projectiles. We feel that congratulations are due you for your part in this achievement."

Investigate these salt baths for all your heat treating processes, from 350° to 2400° F.

Remember, Ajax service includes design and installation of salt bath furnaces and equipment for the whole heat treat job, as may be required. Write for Catalog 107-B, and be sure to get, "ISOTHERMAL QUENCH BATHS APPLIED TO COMMERCIAL PRACTICE." It's free.

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ASSOCIATE COMPANIES:
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AJAX ENGINEERING CORPORATION, *Ajax-Tama-Wyatt Aluminum Melting Furnaces*

"SWORDS INTO PLOWSHARES"

The day is near when we shall put aside at least a part of our arms and turn our production skills to articles of peace. The hard-learned lessons of war taught us production aids which saved precious time and cut down costly errors.

High on the roster stands "FILMONIZE" Self-Sealing Tape. It has sealed precious blood plasma against moisture penetration and contamination. It has labeled intricate parts of assemblies, to expedite factory production and battlefield repair. "FILMONIZE" Self-Sealing Tapes have performed a multitude of such functions well.

It will be ready for reconversion. Those same "FILMONIZE" Self-Sealing Tapes will be used for colorful sealing of your *new* packages without water. They will be used to simplify *new* production problems that will be met by *new* men. The "FILMONIZE" Colored Tape signals, the "FILMONIZE" numeral and lettered tapes will speed output and reduce error in many operations.

Ask your distributor how to fit "FILMONIZE" Tape into your reconversion plans.

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SELF-SEALING TAPES

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INTERNATIONAL PLASTIC CORPORATION
MORRISTOWN • NEW JERSEY

available to industry after the war in Europe is over, and that industry will be able to absorb approximately 4,500,000 of them.

Part of the remainder may be eliminated by shrinkage of the total labor force, which Dr. Habar estimates to be 6,700,000 workers above normal, although this shrinkage is expected to take care of only about a million of them. It will be comprised of persons who have taken temporary war jobs and who leave them before the war in Japan is over.

He suggested an encouragement of workers to return to their former communities, and the return to the 40-hr. week as measures to reduce the number of unemployed.

Other speakers at the conference were Charles A. Myers, of the industrial relations section of the Massachusetts Institute of Technology, and G. B. Arthur, personnel director of the American Thread Co.

WLB Establishes New Stabilized Wage Rate For Foundry Workers

Chicago

• • • Establishment of new stabilized wage rates for foundry workers in the Quincy, Ill., and Minneapolis-St. Paul labor areas, making possible some wage increases in the Twin Cities, was announced recently by the Sixth Regional War Labor Board here.

No stabilized rates had previously been set in Quincy, but seven of the eight factories there are paying essentially the same rate. This means that only one of the Quincy foundries would be eligible for increases, since generally the boards will not approve rates above the stabilized levels. Quincy stabilized rates range from 60c. an hr. in the lower classifications to $1.10 for coremakers and molders.

In the Twin Cities, different stabilized rates formerly existed for St. Paul and Minneapolis. The regional WLB equalized rates for the two cities, thereby providing increases from 1 to 7c. an hr. in various classifications. In St. Paul the old stabilized rate for common labor was 70c. an hr. while in Minneapolis it was 72c. an hr. New stabilized rate for common labor in foundries of both cities is 74c. an hr., thus providing an increase of 2c. an hr. in Minneapolis and 4c. an hr. in St. Paul. Coremakers and molders under old stabilized rates drew $1.00 an hr. in Minneapolis and $1.06 an hr. in St. Paul. The new rate for both cities is $1.07 an hr.

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Standard and Special

FROM 6" INSIDE DIAMETER TO 100" OUTSIDE DIAMETER
COMMERCIAL FINISH OR ULTRA-PRECISION

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PRECISION MACHINE WORK OR GRINDING

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For excellence in production of extremely precise, unusually large ball and roller bearings

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PACKAGED METAL ENGINEERING*

speeds conversion of *your* ideas into postwar products NOW! with—

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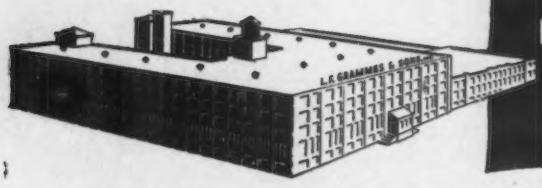

As conversion day draws near, management must make its own plans for postwar manufacturing by converting ideas and blueprints into models and samples. To speed eventual production of *your* postwar product, Grammes Contract Service *pre-conversion* aid in Research, Design, and Engineering is available NOW. This broad service can also solve your problems of *retooling, inadequate plant facilities, inexperienced help, lack of "know-how" in parts-production, development of ideas into new products, and redesigning and improving old products.*

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NEW YORK CHICAGO DETROIT CLEVELAND MILWAUKEE PHILADELPHIA

Postwar Community Handbook for Small Business Issued

New York

• • • **What each community** can do for the postwar prosperity of its own small business concerns, and how to go about it, is the subject of a "CED Community Handbook on the Special Problems of Small Business," issued today to help guide the efforts of the 2000 local CED committees in all parts of the country "to stimulate the creation of new businesses and to help existing small businesses grow."

Pointing out that there are 2 million business enterprises in the United States with fewer than 100 employees, as compared with only some 3500 firms employing more than 1000, Lou Holland, chairman of the CED Committee on the Special Problems of Small Business, urged that "the best solutions to these problems lie within the communities" through "concerted action over a long period by many different private groups working together, and in cooperation with federal, state and local governments."

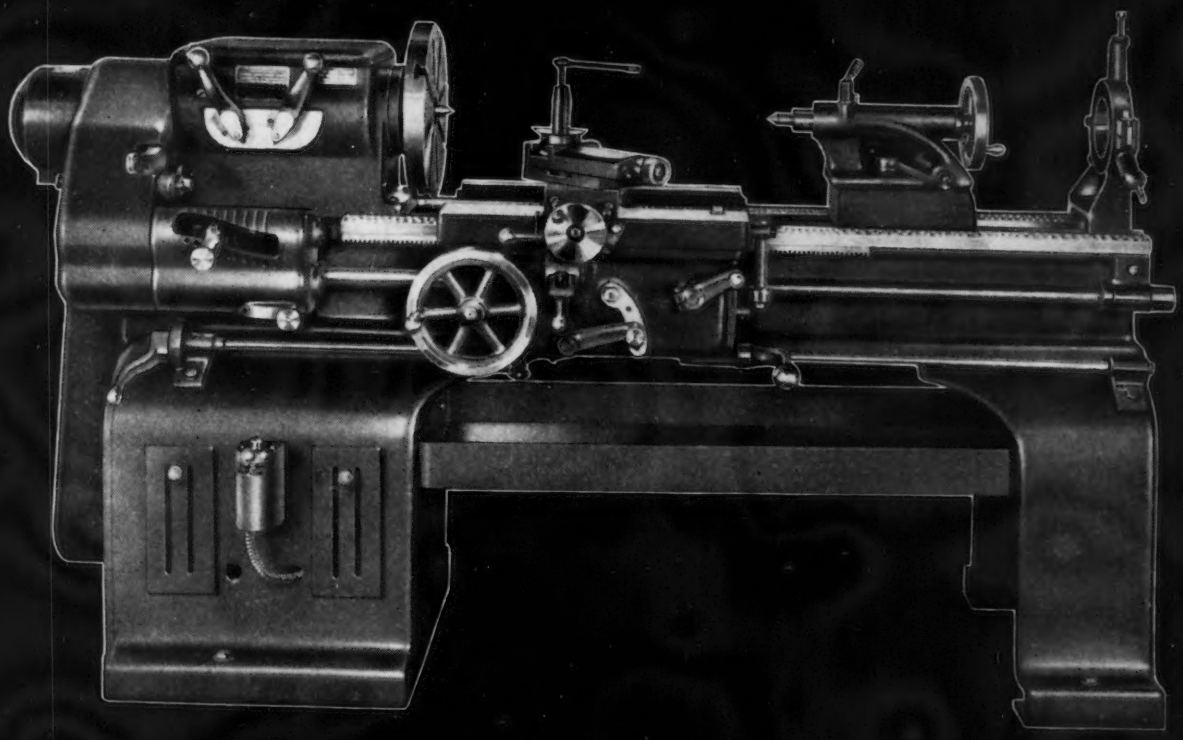
The handbook lists the special problems of small business under five heads: Aid to Management; Technical Information; Finance and Credit Assistance; Opportunities for New Business; and Local Obstacles to the Birth and Growth of Small Enterprise. It continues:

"A major handicap of the small businessman is the limitation on his time and facilities for gathering the needed facts, plus the additional problem that he does not know where to get them." To provide him with these "planning tools" the handbook urges concerted action.

As an example of what one community can do for itself through concerted action the handbook cites Worcester, Mass., where planning by the local CED and Chamber of Commerce has resulted in a permanent Industrial Bureau with a staff of specialists to aid the expansion of local small businesses by

a) providing production, accounting and sales engineering counsel to small industries, including development and protection of local inventions;
b) helping arrange financial credits through existing institutions; and
c) assisting the development of foreign markets "to help a local manufacturer to market safely

Through fifty-seven years of specializing exclusively in lathe manufacturing the trade-wise have learned that the name SEBASTIAN means more value for their lathe-purchasing dollar.



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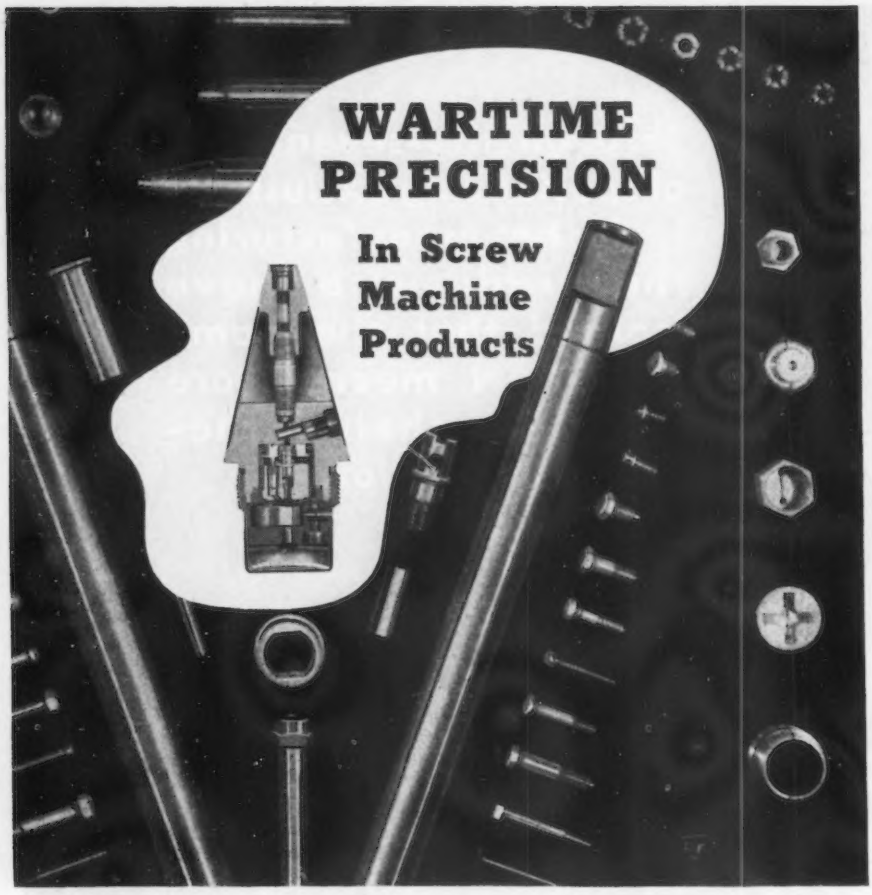

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The combination of experience, facilities and skilled personnel which Federal Screw can offer may bring to you the right solution to many of your post-war screw machine product problems. Let's talk it over.

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pins in Guatemala or to locate warehouse space in a free trade port in the Orient."

Other examples cited of community action to meet specific local problems are:

The Richmond, Va., Business Clinic which serves as an advisory board to give detailed and expert assistance to returning veterans who want to go into business for themselves;

Franklin Square, Long Island, N. Y., where a "face-lifting project" is under way, aimed at postwar renovation of all the town's store fronts and interiors, achieving harmonious design and lower costs by joint action.

Exhibitors at The Metal Congress

(CONTINUED FROM PAGE 86)

North American Mfg. Co., Cleveland. Booth C-320.

North American Philips Co., New York. Booth J-605.

Nox-Rust Corp., Chicago. Booth H-625.

O

Oakite Products, Inc., New York. Booth E-134.

Ohio Aircraft Fixture Co., Cleveland. Booth P-517.

Ohio Carbon Co., Cleveland. Booth G-603.

Ohio Crankshaft Co., Cleveland. Booth A-340.

Ohio Overall Cleaning Co., Cleveland. Booth A-634.

Ohio Steel Foundry Co., Springfield, Ohio. Booth D-134.

Olson Filtration Engineers, Chicago. Booth D-626.

Omega Research Laboratory, Inc., Detroit. Booth G-610.

O'Neil-Irwin Mfg. Co., Minneapolis. Booth C-640.

Osborn Mfg. Co., Cleveland. Booth B-618.

Owens-Corning-Fiberglas Corp., Toledo, Ohio. Booth B-214.

Ozalid Products, Binghamton, N. Y. Booth B-209.

P

Pangborn Corp., Hagerstown, Md. Booth A-611.

Park Chemical Co., Detroit. Booth D-141.

Parker Appliance Co., Cleveland. Booth B-604.

Peerless Tool & Engineering Co., Chicago. Booth B-409.

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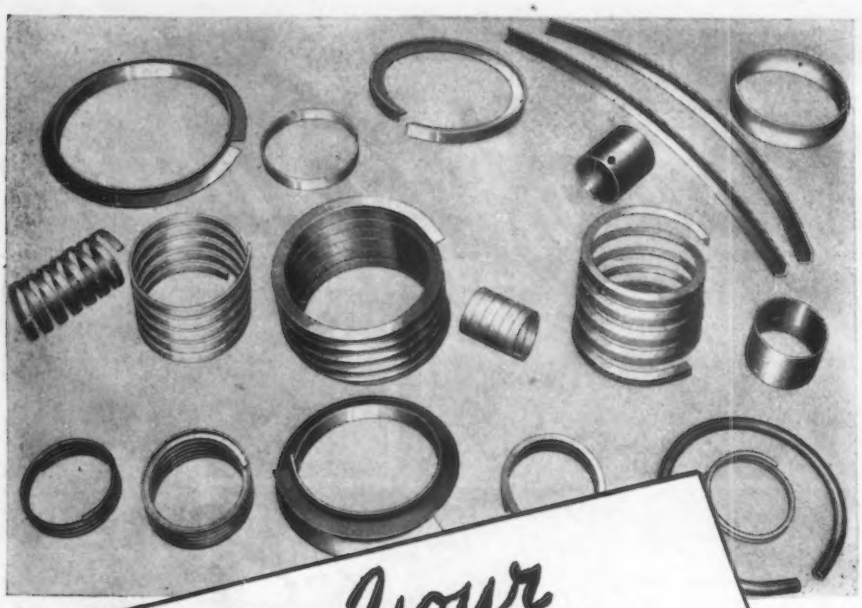

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Physicists Research Co., Ann Arbor, Mich. Booth B-121.

Picker X-Ray Corp., New York. Booth G-617.

Pines Engineering Co., Aurora, Ill. Booth F-620.

Poor & Co., Waukegan, Ill.

Porter-Cable Machine Co., Syracuse, N. Y. Booth L-103.

Precise Products Co., Racine, Wis. Booth A-309.

Precision Scientific Co., Chicago. Booth I-605.

Progressive Welder Co., Detroit. Booth B-413.

Promat Div. of Poor & Co., Waukegan, Ill. Booth C-428.

Pyrometer Instrument Co., New York. Booth C-331.

Prestole Div., Detroit Harvester Co., Detroit. Booth A-204.

R

Radium Chemical Co., New York. Booth E-640.

Ransburg Co., Harper J., Indianapolis. Booth E-110.

Ransohoff, Inc., N., Cincinnati. Booth A-601.

Ransome Machinery Co., Dunellen, N. J. Booth B-102.

Redmer Air Devices Corp., Chicago. Booth C-630.

Reeves Pulley Co., Cleveland. Booth P-527.

Reinhold Publishing Co., New York. Booth D-431.

Republic Drill & Tool Co., Chicago, Ill. Booth H-611.

Resistance Welder Manufacturing Association, Philadelphia. Booth D-336.

Revere Co., Wallingford, Conn. Booth A-123.

Revere Copper & Brass Co., New York. Booth B-306.

Revista Industrial, Cleveland. Booth E-146.

Reynolds Metals Co., Louisville, Ky. Booth D-617.

Rheem Mfg. Co. & Rheem Research Products, Inc., Baltimore. Booth A-320.

Richards Co., J. A., Kalamazoo, Mich. Booth B-330.

Riehle Testing Machine Div. American Machine & Metals Inc., East Moline, Ill. Booth A-424.

Rustless Iron & Steel Corp., Baltimore. Booth C-102.

Joseph T. Ryerson & Son, Inc., Cleveland. Booth B-141.

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Salkover Metal Processing Co., Chicago. Booth G-611.

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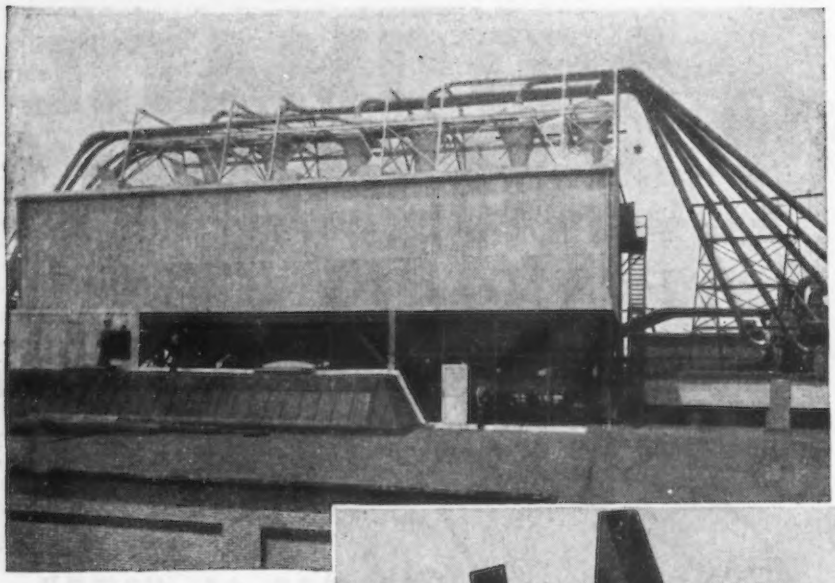

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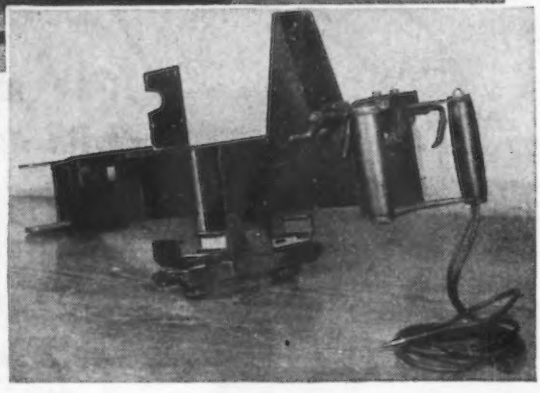

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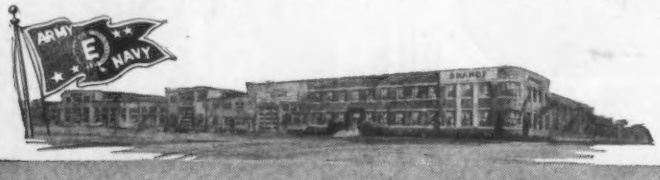

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Schrader's Son Div. Scovill Mfg. Co., Inc., Brooklyn. Booth H-633.
Selas Corp. of America, Philadelphia. Booth D-122.
Sentry Co., Foxboro, Mass. Booth C-324.
Seybold Div. Harris, Seybold Potter Co., Springfield, Ohio. Booth K-618.
Shakeproof Inc., Chicago. Booth C-310.
Sheldon & Co., E. H., Muskegon, Mich. Booth J-611.
Shell Oil Co., New York. Booth J-604.
Sherman & Co., New York. Booth F-621.
Size Control Co., Chicago. Booth C-213.
Sly Mfg. Co., W. W., Cleveland. Booth A-306.
Smith Tool & Engineering Co., Bucyrus, Ohio. Booth I-616.
Society for Experimental Stress Analysis, Cambridge, Mass. Booth C-215.
Solventol Chemical Products, Detroit. Booth E-610.
Sparkler Mfg. Co., Mundelein, Ill. Booth I-626.
Spencer Turbine Co., Hartford, Conn. Booth B-118.
Sperry Products, Inc., Hoboken, N. J. Booth B-414.
Standard Alloy Co., Cleveland. Booth D-410.
Standard Oil Co. of Ohio, Cleveland. Booth B-609.
Standard Steel Spring Co., Coraopolis, Pa. Booth S-170.
State Mfg. & Construction Co., Franklin, Ohio. Booth G-625.
Steel, Cleveland. Booth D-414.
Steel Publications, Inc., Pittsburgh. Booth H-622.
Steel Tools, Cleveland. Booth S-158.
Sterling Alloys, Inc., Woburn, Mass. Booth B-115.
Stevens Grease & Oil Co., Cleveland. Booth I-610.
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Stuart Oil Co., D. A., Chicago. Booth B-324.
Sturgis Products Co., Sturgis, Mich. Booth H-621.
Sunnen Products Co., St. Louis. Booth C-402.
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Sutton Engineering Co., Pittsburgh. Booth A-640.

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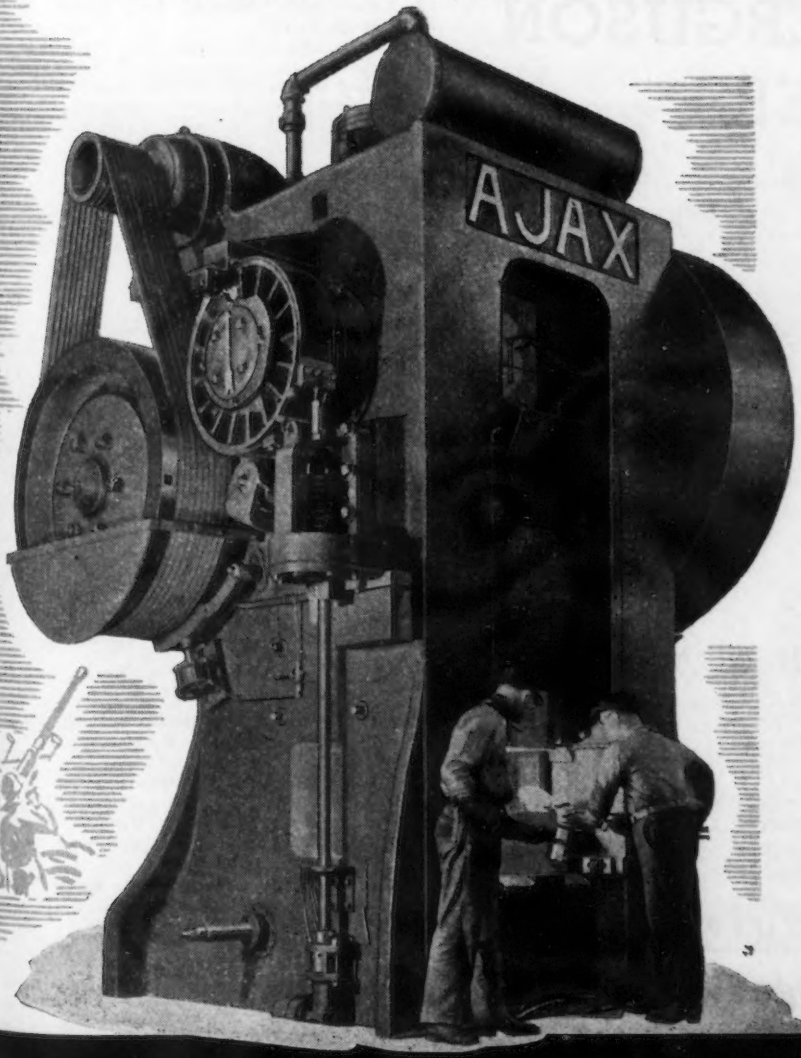

Today, in forge shops all over the country AJAX Forging Machines and Forging Presses are performing a vital role in the high speed production of material for war, such as parts for ships, guns, tanks, airplanes, bombs and shells—adding their full share to industry's all out effort toward speeding victory. And when that goal has been attained and the requirements for war are curtailed, with merely changing of the dies these same machines and presses will produce, economically at high production rates, accurately forged parts for automobiles, refrigerators, farm implements, railroad cars, and many, many more products to immediately meet the requirements of a new and greater peacetime economy.

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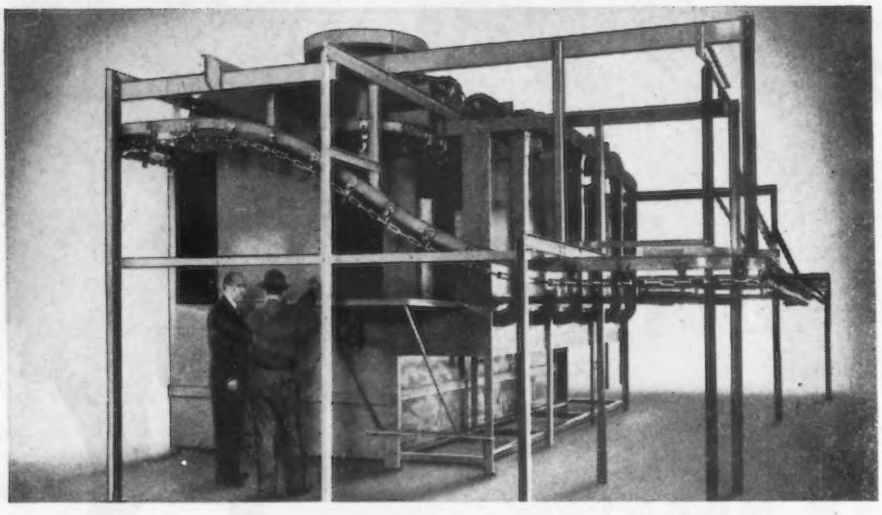

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Swedish Crucible Steel Co., Detroit. Booth K-621.

T

Tagliabue Mfg. Co., C. J., Brooklyn. Booth C-408.
Tal's Prestal Bender Inc., Milwaukee. Booth B-403.
Tel Autograph Corp., New York. Booth C-238.
Tempil Corp., New York. Booth C-117.
Tennant Co., G. H., Minneapolis. Booth S-112.
Texas Co., New York. Booth B-425.
Thompson Electric Co., Cleveland. Booth S-120.
Tinnerman Products, Inc., Cleveland. Booth I-617.
Torit Mfg. Co., Detroit. Booth A-620.
Towmotor Co., Cleveland. Booth F-605.
Trent Co., Harold E., Philadelphia. Booth I-611.
Trent Tube Mfg. Co., East Troy, Wis. Booth B-203.
Tri-Clover Machine Co., Kenosha, Wis. Booth B-203.
Triplex Machine Tool Co., New York. Booth D-604.
Troy Stainless Steel Products, East Troy, Wis. Booth B-203.
Tuff-Hard Corp., Detroit. Booth S-132.
Tyler, W. S., Cleveland. Booth C-413.

U

Udylite Co., Detroit. Booth D-628.
Ultra Lap Machine Co., Detroit. Booth D-604.
Union Steel Products Co., Albion, Mich. Booth F-526.
United Chromium, Inc., New York. Booth H-636.
United Welding Co., Middletown, Ohio. Booth J-603.
U. S. Hoffman Machinery Corp., New York. Booth A-636.
U. S. Stoneware Co., Akron, Ohio. Booth H-640.
Universal-Cyclops Steel Corp., Bridgeville, Pa. Booth G-605.
Upton Electric Furnace Div., Commerce Pattern, Foundry & Machine Co., Detroit. Booth I-625.

V

Vander Horst Corp., Cleveland. Booth C-425.
Vascoloy-Ramet Corp., North Chicago, Ill. Booth P-522.

W

State of Washington, Seattle. Booth D-603.
Wayne Foundry Co., Detroit. Booth H-608.
Welding Engineer Pub. Co., Chicago. Booth D-329.
Wellman, S. K., Cleveland. Booth D-150.
Wells Mfg. Co., Three Rivers, Mich. Booth D-611.
Western Metals, Los Angeles. Booth A-625.
Westinghouse Electric & Mfg. Co., Pittsburgh. Booth B-340.
Whalley Co., George, Cleveland. Booth C-229.
Wheelco Instruments Co., Chicago. Booth C-138.
Wiegand Co., Edwin L., Pittsburgh. Booth E-605.
Williams & Co., Cleveland. Booth B-431.
Willson Products, Inc., Reading, Pa. Booth G-613.
Wilson Mechanical Instrument Co., New York. Booth C-134.
Wolfe-Kote Co., Cleveland. J-600.
Wood Products Corp., J. R., New York. Booth B-218.
Woodworth, N. A., Co., Detroit. Booth F-140.
Wright-Hibbard Industrial Electric Truck Co., Inc., Phelps, N. Y. Booth B-206.

Y

Yale & Towne Mfg. Co., Chicago. Booth G-821.
Yerges Mfg. Co., Utica, N. Y. Booth

Z

Zager Tool, Inc., Cleveland. Booth E-628.

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in any manufacturing process means lower costs, greater efficiency, better quality, and increased production... Ransome Positioning Equipment is widely used for tilting and turning a great variety of products, so that workmen can do their jobs more easily and better.

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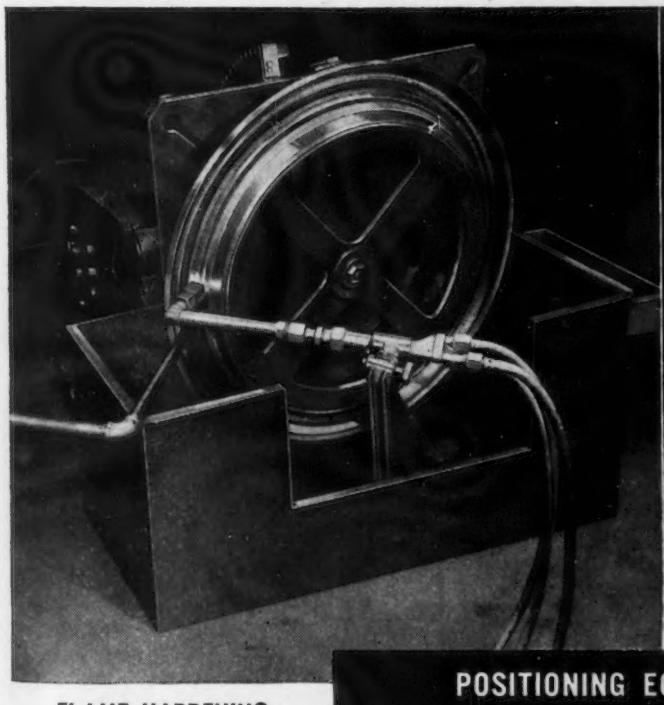

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Ampco-Trode coated aluminum bronze electrodes deposit weld metal comparable in strength, ductility, and bearing qualities with the various grades of cast Ampco Metal. This deposit can be applied to cheaper base metals to build up surfaces that resist wear, shock, and corrosion. Any grade of Ampco-Trode —selected for your required physical properties — can be welded to almost all metals and their alloys.

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W-4

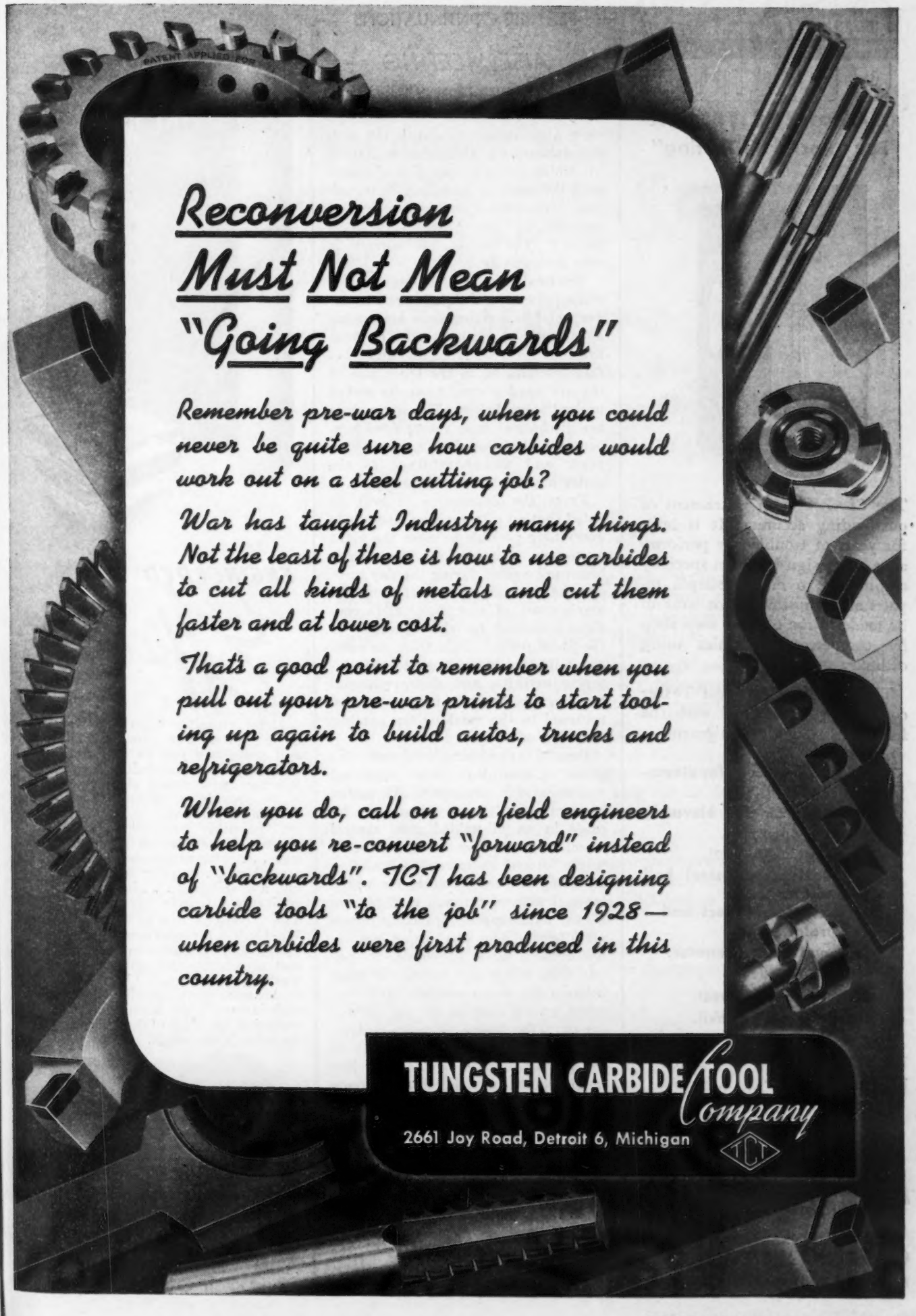
FEATURE CONTINUATIONS

Extending Cutting Tool Life By Refrigeration And Nitriding

(CONTINUED FROM PAGE 77)

6. Check the temperature of the salt bath. It should be 1000 deg. F. from top to bottom of the pot.
7. Transfer tool from preheat furnace to salt bath. Take care to see that the preheated tool does not cool below 850 deg. F. during transfer. This can be checked by dipping a portion of the tool into the molten salt. If this part of the tool is covered with a white layer of frozen salt the tool is not over 850 deg. F, and must be returned to the preheat furnace. If the immersed portion of the tool is not covered with frozen salt, continue to lower the tool into the bath until it is completely covered. The tool should be suspended in the middle of the pot while nitriding. Allow it to remain in the salt for about 20 min., depending upon application.
8. Remove from bath and allow to air cool. Do not cool rapidly by air blast or quench.
9. Wash off salt in hot water (about 150 deg F.). It is imperative that all the salt is removed to prevent future corrosion.
10. Allow tool to dry and dip it in oil to prevent corrosion during transportation and storage.
11. Replace with new salt the accumulated sludge at the bottom of the pot every 24 hr.
12. Routine instrument and furnace checking is absolutely essential.
13. It is desirable to prohibit the use of equipment containing nickel to prevent electrolytic nickel deposits on the tool during nitriding.
14. When starting a completely fresh bath it is necessary to age it for 15 hr. at 1000 deg. in order to obtain the correct cyanate content.

While all of the above investigations indicate increases in tool life by means of refrigeration and salt bath nitriding it is by no means proof that they may be used as cure-alls for high speed steel tool troubles. Good tool design and application is still of prime importance in obtaining the highest production yield.



Reconversion Must Not Mean "Going Backwards"

Remember pre-war days, when you could never be quite sure how carbides would work out on a steel cutting job?

War has taught Industry many things. Not the least of these is how to use carbides to cut all kinds of metals and cut them faster and at lower cost.

That's a good point to remember when you pull out your pre-war prints to start tooling up again to build autos, trucks and refrigerators.

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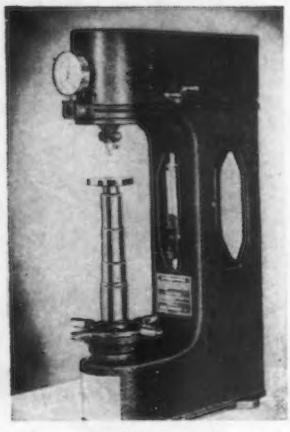

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AISE MEETING

(CONTINUED FROM PAGE 87)

nace temperature had to be raised to very high values to ignite the bed. The furnace has a flame spread of 84 in., which is one in. per inch of travel with the machine traveling 84 in. per min. This causes an ignition time of one min. and has proved very satisfactory. The furnace at Warren is coke oven gas fired.

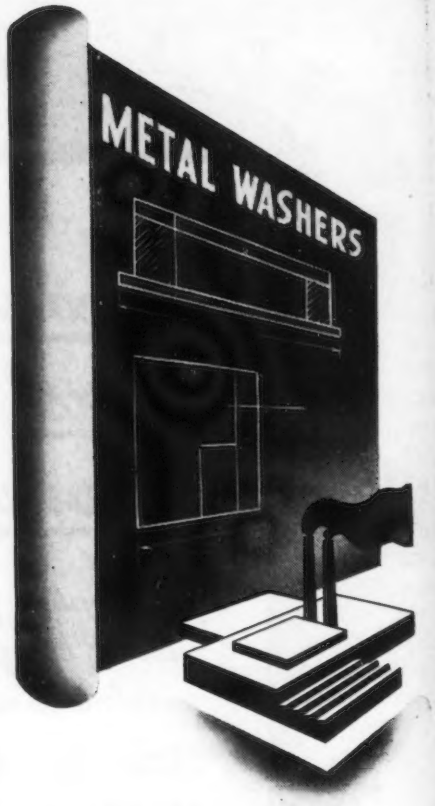
The production of the sintering machine falls down a Grizzley chute, under which is a return fines bin having a capacity of 1850 cu. ft. The fines are thus removed from the sinter before discharging to the stock pile in the ore yard where it can be picked up by the ore bridge. The sinter fines are discharged from return fines hopper by a vibrating feeder onto a conveyor and thence returned to the sinter machine for reprocessing.

From the description it will be noted that an attempt was made to do everything possible to make the plant continuous in operation. The storage bins can be filled during the day turn, and the sintering plant will then have ample stock of raw material to continue operation for the remainder of the 24-hr. period. Dust from the various collectors is returned to the sintering machine and sinter material too fine for the blast furnace is also returned to the machine for another sintering operation.

Careful consideration was also given to obtaining proper electrical equipment for the plant. All motor starters are oil immersed and are located in an all-welded steel control room, ventilated by being connected to the filtered air system. All cooling air going into the sintering fan motor room is filtered through a 17,200 cu. ft. per min. capacity traveling screen air filter and then discharged into the motor room by a 12,000 cu. ft. per min. fan, which also serves the room housing the motor starter. The conveyor system controls for the conveyors up to the storage bins are centralized on a panel located at the top of the storage bins. The conveyor system in the plant proper is controlled from a panel adjacent to the head of the sintering machine.

Symposium—Cleaning of Steel For Subsequent Coating

IN the symposiums or round table discussions on metal cleaning before coating, the authors of the papers presented covered the various phases of cleaning. N. E. Cook, gen-



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Metal cleaning is an important step in the production process. Efficiency and speed are just as important there as in any other production department. Whether your metal cleaning problem is to provide a perfect bond before finishing operations such as rustproofing, painting, galvanizing, or electroplating . . . or cleaning between machinings . . . prior to gauging, inspection or assembly . . . or prior to packing, storing, and shipping . . . it is possible our engineers can help you.

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eral superintendent of galvanizing. Wheeling Steel Corp., discussed the need for cleaning, the coating operator's problems, the degree of cleaning necessary for tight coatings and the choice of the type and degree of cleaning. J. J. Duffy, Jr., development engineer, Pennsylvania Salt Mfg. Co., Philadelphia, concerned himself primarily with methods of cleaning, discussing the characteristics of chemical, physical and mechanical means of removing foreign materials from steel prior to coating. Lane Johnson, Jr., development department, United Engineering & Foundry Co., Pittsburgh, dealt with strip pickling, the black pickler and other mechanical equipment for cleaning metal.

FROM the standpoint of the coating operator, the cleaning of the base steel prior to coating is probably the most important step in the total process. It is a well recognized fact that the quality of coatings and of the finished coated products depends, to a great extent, on the cleanliness of the base to which the coatings are applied. It is also a well recognized fact that, in the past, we have not attached enough importance to this phase of the process.

Coatings, whether they be metallic, such as lead, tin, terne, or zinc; or whether they be organic, such as paints or lacquers or enamels, or whether they be special chemical treatments such as have been used extensively for many war products, are applied for some specific purpose, the purpose generally being to give added protection to the steel base. The coating operator is interested not only in producing a quality product, but, more important, he should also be interested in making the most efficient use of the coating material. Each type of coating material has fairly definite properties such that for any standard unit of thickness a rather definite amount of protection may be expected.

What degree of cleaning does the coating operator need? This is a much more difficult question to answer, since we seem to have no definite yardstick, at the moment, with which to measure cleanliness. Many specifications, especially government specifications, indicate that material shall be free from rust, oil, dirt, etc., but they do not specify methods for accomplishing the results, nor do they establish any common testing procedure for determining whether or not a surface is chemically and physically clean. Certainly we cannot use

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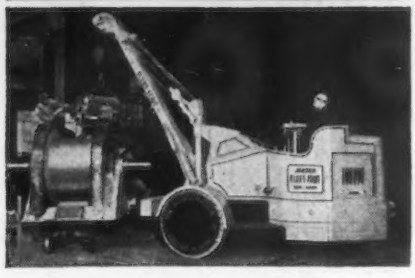

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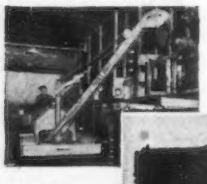

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visual inspection as a test, for such a method proves very faulty. We cannot use the common "No water break" test to determine cleanliness for it is possible to have a sheet covered with smudge which also gives a positive "No water break" test. Some work has been done on testing for oil contamination after cleaning, by observing fluorescence under ultra violet light, but such methods of testing have not yet proven of much value. Therefore, we are still searching for methods which will give us positive tests of cleanliness. Most of our present testing is necessarily done after the product is finished, rather than on the material before coating. In electrolytic coatings we can determine cleanliness, in a rather crude way, by observing whether or not the coating "takes" on the base steel.

Generally, if the sheet is not clean the electrolytic coatings will just not cover the steel base. But, with many improvements in the methods of electroplating, this is not now always true for, in some cases, it is possible to apply electro coatings over unclean material, in which case the material passes visual inspection but will not be satisfactory in service. In most hot metallic coatings, fluxes are used as a first step in the coating process. These fluxes are, in themselves, partial cleaners, but not capable of doing a complete cleaning job. Unfortunately, in most hot metallic coatings, it is possible to cover up and bridge over unclean spots in the sheet, with the result that the finished material looks satisfactory in visual inspection, but will not stand up in service. In applying organic coatings, the steel base must be absolutely clean of all foreign materials in and on the steel base, and must also be free of any residues from cleaning processes which would react subsequently with the coating material to lessen its protective value. In the case of some painting and lacquering, the coating film is not applied directly to the steel base, but to an insulating chemical layer, in which case it is necessary to clean the steel surface sufficiently to effectively take the insulating film. It is obvious, then, that there are different degrees of cleanliness needed for different types of coating processes. It is also obvious that, until we are able to find some definite, positive, method of testing the cleanliness of a steel base sheet prior to coating, the coating operator will be unable to answer definitely the question as to the degree of cleaning needed, and

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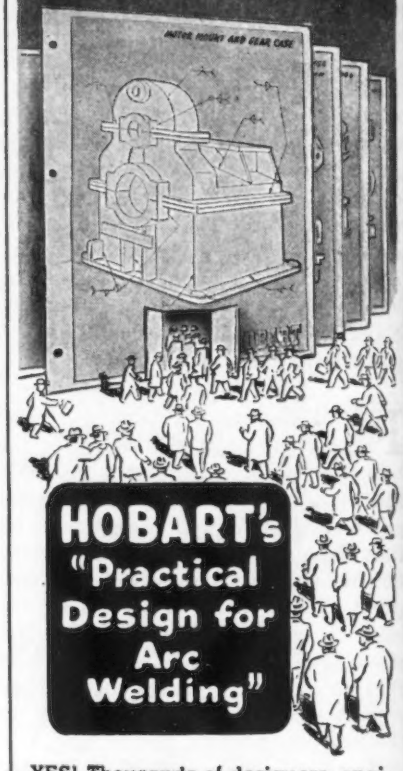

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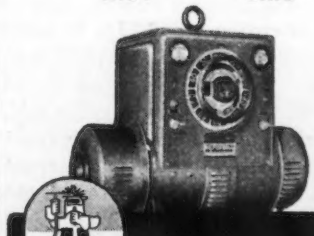

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this method of testing, to our knowledge, has not yet been found.

Insofar as the coating operator is concerned, the choice of the type and degree of cleaning should be based on the following considerations:

First, the cost. The coating operator is usually dealing with small pieces of material, or relatively small tonnages of material. In attempting to clean this type of material by some combination of processes, the cost is naturally much higher than when the major part of the cleaning is done at high speeds and in larger units. Therefore, looking at the over-all total cost of the finished product, the coating operator believes that a saving in cost would be realized if the material were completely or almost completely cleaned at the source.

Second, the coating operator believes that more efficiency would be obtained if the material were cleaned at the source, where it could better be determined just what it is necessary to clean, based on the processes of producing. This would tend toward more efficiency in the cleaning operation, and better standardization of the product.

Third, while some of the newer processes such as gas pickling, etc., are designed in such a way as to be an integral part of the coating units, it is not generally good technical procedure to attach too complicated a cleaning unit to a coating operation, especially if the coating operation is a continuous or semi-continuous one. There is always a possibility of developing trouble in the cleaning end of the operation which would slow down or tie up completely for some time the more important coating unit proper. Therefore, the coating operator believes that steel should come to him in such condition that either no cleaning operation is needed before coating, or certainly no cleaning operation that is too complicated and involved in its workings.

Fourth, the coating operator is usually interested in obtaining cleaned sheets which have not had their physical properties altered in the cleaning process and, for that reason, he believes that there should be some cleaning procedure devised which would accomplish this at the source in such a manner that any slight degree of cleaning which he might be required to do just prior to coating would not alter the physical properties further.

IN the production of electrolytically coated steel by the modern continuous strip method, it is axiomatic

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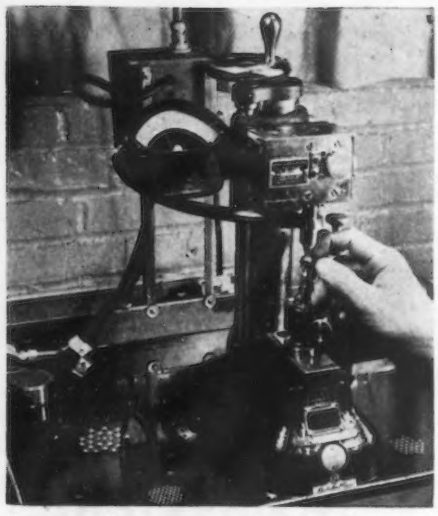

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that unless absolutely clean strip, having properly etched surfaces, is delivered to the plating unit, the production of prime quality plate is seriously reduced, if not rendered altogether impossible, Lane Johnson, Jr., of United Engineering & Foundry Co., related.

Without the black pickler, however, the very existence of the entire flat rolled industry could not have been. A general statement can be made that complete removal of rolling scale not only actually permits the practice of the art of cold reduction, and synonomously the ultimate production of electro-plated products, but also that the degree of removal decidedly affects the individual efficiencies and economies of each of the processes involved.

Black pickling involves the handling of hot rolled strip for the purpose of removing by chemical means the several iron oxides from its surfaces and for the production of scale-free stock suitable for succeeding processes, the principle of which is cold reduction.

The semi-continuous type strip pickler was originally developed with the requirements of certain members of the "Little Steel" section of the industry in mind and has, after several years of successful operation in the several plants in which installations have been made, proved so satisfactory that a prominent place in post-war pickling planning is predicted for it.

The conventional continuous type strip pickler involves joining of successive coils in order to provide continuity; requires looping pits to permit storage capacity so that time required to join without slowdown in the processing zone is provided; and must include shearing facilities for parting after pickling so that individual coils can be delivered for future rolling or other processing.

The semi-continuous type, on the other hand, takes advantage of the inherent stiffness of flattened hot rolled strip and each coil is processed individually by pushing through the various tanks, pinch rolls, etc., thus eliminating the need for joining equipment, looping pits and shearing facilities and resulting in substantial savings in investment and space required.

In short, every effort has been devoted toward evolving a pickling plant to meet the demand for an installation involving lowered investment cost; to meet production requirements in spite of a lowered available manpower potential; to permit operation in a satisfactory and effective manner and to attain cumulatively an appreciable reduction of overall operating costs.

Experience and satisfaction accruing from existing installations seem to testify to the accomplishment of these goals.

CLEANING is one of the most significant operations in steel manufacture in obtaining increased production, lower costs, better quality, and improved appearance, J. J. Duffy, Jr., of Pennsylvania Salt Mfg. Co., claimed. The choice of proper chemical for the cleaning bath is just as important as the selection of equipment and the technique of applying the various finishes. There are three major forces by which soil can be removed from steel surfaces: Chemical, physical, and mechanical. Examples of each of these classes are:

1. Chemical Means—Saponification, neutralization, and other chemical reaction combinations.

2. Physical Means—Emulsification, solubilization (solvency).

3. Mechanical Means — Agitation (movement of work or solution and electrolysis), and abrasion (brushing, sand blasting, etc.)

There is no known chemical substance or method that employs the maximum desirable features of each of these three forces. A properly buffered, alkaline cleaner in hot water solution, used as a soak and in combination with electrolytic current, has proved satisfactory. There is still, however, room for improvement.

There is one obvious shortcoming of an alkali when properties of this kind are reviewed. An alkaline cleaner has little true solvent power. It functions through emulsification, saponification, and agitation.

Recent studies of solvent properties have shown some encouraging results. Outstanding among these is the use of the solvent emulsion type cleaner. As far as the steel industry is concerned, however, these studies are still in progress and no definite conclusions have been reached. Solvent emulsions for use in metal cleaning were developed in the early '30's, and are gradually being recognized as definite aids to the cleaning processes of many metal finishing industries.

Indicated benefits from the use of the solvent-alkali combination are as follows: (1) A cleaning solution that is less vulnerable to variations in (a) the type of soil, (b) water conditions, (c) equipment, and (d) immersion time; (2) quick, effective removal of oil and rust; and (3) more satisfac-

tory cleaning of sheets after coating, such as hot dip tinning.

The solvent emulsion cleaner is always used in conjunction with standard alkaline cleaning. Its application does not represent a radical departure from established cleaning procedures —straight alkaline cleaning is still the final cleaning. It merely requires the addition of another chemical to the cleaning process which supplies some features which are, at present, lacking in the alkaline bath.

Variations in the water supply might very well have an immediate and direct bearing on the following important phases of the cleaning operation: (1) Efficiency in cleaning power. (2) the adherence of coating. (3) appearance of coating. (4) cleaner consumption.

Recent developments in the phosphate and synthetic wetting agent fields have aided tremendously in overcoming some of these water difficulties. While their application is limited at the present time, it is certain that, in the postwar era, when these products are more available, they will be more generally used for this purpose.

Some degree of controversy exists in the steel industry on the subject of various methods of electrolytic cleaning together with its contrast to soak (or non-electrolytic) cleaning. This has prevailed in the electroplating industry for some years and only recently is there some semblance of agreement. Practice will vary from one mill to another, depending upon equipment, production, personnel, and type of soil encountered. The important fact to remember seems to be that agitation is necessary. Whether it comes as a result of the convection currents of the steam coils, movement of the strip, or from other means of agitation, is of no serious consequence. Pennsylvania Salt Mfg. Co.'s experience has been in favor of the use of electrolytic cleaning in spite of some installations where successful cleaning is done without its aid. There is a need, if current is used, for the impression of sufficient potential in order that adequate gassing is provided. A current density of 35 to 40 amps. per sq. ft. would seem to be the minimum in order to justify the costly installation which the use of current requires. The combination of direct current first and then reverse appears to have accepted favor. It is believed this is due, partly, to the balancing out or neutralizing of the disadvantages of each current. As you know when direct current is used, the work being the cathode, certain "plating out" action is realized. With the use of reverse current, less gassing takes place and the danger of oxidation is ever present.

In conclusion, it is believed that there is no one chemical or chemical cleaning process which represents a panacea. The specific conditions existent at the mill under consideration must be thoroughly studied and the chemicals applied to cleaning chosen accordingly. Until the day when some research chemist develops such a product, serious consideration must continue to be given to the cleaning operation.

Base-Metal Factors In the Phosphate Process

(CONTINUED FROM PAGE 66)

same behavior when oxidizing agents are used as accelerators, as here again the components of the alloy have only a slight influence on the formation of the phosphate layer. It is even possible to phosphate satisfactorily steel containing 12 per cent chromium.

(*b*) *Physical State of the Metal Surface*—Roughening the surface mechanically or chemically induces the formation of fine-crystalline phosphate layers. This roughening increases the velocity of nuclear formation, as shown by experiments with a zinc phosphate bath containing nitrate.

(*c*) *Pretreatment of the Surfaces*—It is very important to pretreat the surface suitably if a good phosphate coating is to be produced. Impurities, such as rust, scale, rolling and drawing skins, fats, oils and soaps, reduce the velocity of nuclear formation and must be removed by pickling and fat solvents. In some cases, very thin films of oil may, however, promote the formation of fine-crystalline phosphate deposits. These thin films retard the velocity of growth to such an extent that the velocity of nuclear formation is thereby raised. This latter velocity can also be increased by suitable pretreatment of the surfaces. Solutions of copper salts and nitrites, for example, refine the formation of the phosphate layer. The preliminary heat treatment of the surface also has an important influence on the character of the surface film formed. Steel sheets with the same alloy constituents, if pickled and cleaned under identical conditions, may exhibit entirely different types of phosphate layers if they have undergone different preliminary heat treatments.

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MACHINE TOOLS

. . . News and Market Activities

Tool & Die Makers Elect R. F. Moore

Cleveland

• • • Richard F. Moore, president of the Moore Special Tool Co., Inc., Bridgeport, Conn., was elected president of the National Tool & Die Manufacturers Association at its annual meeting held here recently. A convention to celebrate the first year of the association's existence, was to have been held in Buffalo, Sept. 28, 29 and 30, but the infantile paralysis epidemic there forced its cancellation.

Mr. Moore succeds L. A. Sommer, president of the Sommer & Adams Co., Cleveland, who is credited with founding the association last year.

Other officers elected are: vice-president, Willis G. Ehrhardt, president Ehrhardt Tool & Machine Co., St. Louis; treasurer, H. F. Jahn, president, The B. Jahn Mfg. Co., New Britain, Conn.; and secretary, Ben Buerk, president, Buerk Tool Works, Buffalo, N. Y.

The NTDMA was organized a year ago to help alleviate war conditions which hit the tool and die industry harder than many others, particularly in manpower, because of the long apprenticeships which workers must serve in order to operate the complicated machine tools used to make the machinery of production.

o o o

Continuous Russian Buying Bolsters Machinery Market

Chicago

• • • Continuing Russian business with more in prospect is bolstering manufacturers volume in certain types of equipment. Planers, for which substantial orders were placed several weeks ago, lathes, and boring machines are among the standard items which are benefiting particularly from this direction. It was not learned what priority this business carries, but it is obvious from the type of equipment being purchased that it may particularly benefit those manufacturers whose backlogs have been depleted the most.

Placing of orders by domestic customers without priority continued to account for a minor volume of business, but the delivery situation on this business, particularly on special-purpose machinery which is most critical, is not encouraging. A typical delivery situation in this category is about three months. Six month delivery, about which some complaint has been heard from the automotive industry, is so rare as not to be discoverable in a casual survey.

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Machine Tool Industry Needs Manpower Assistance

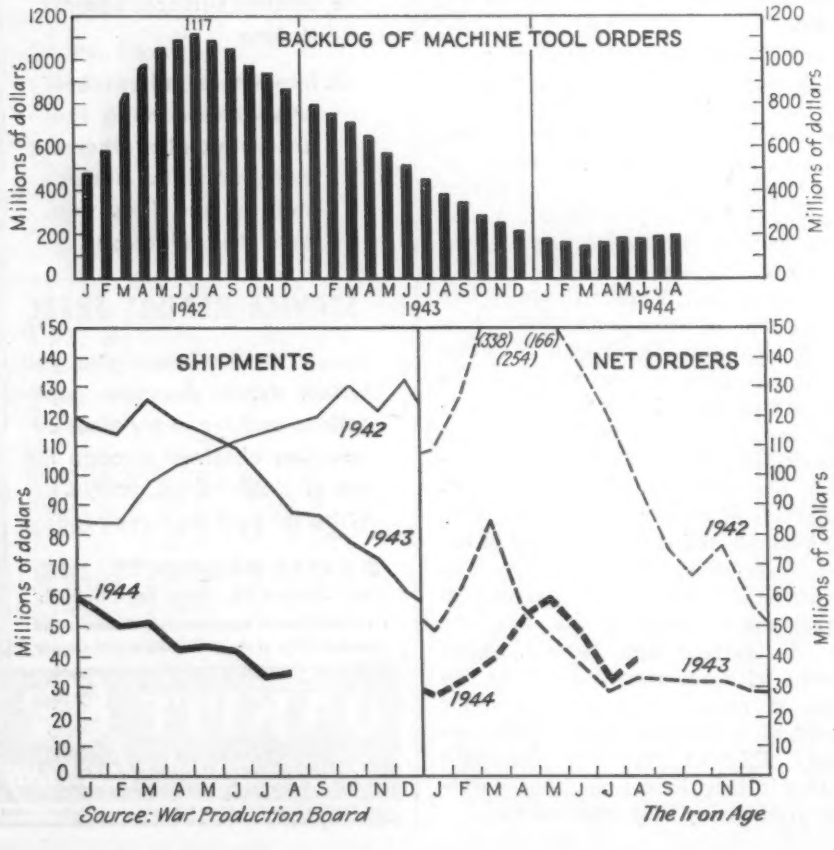
• • • War programs will be delayed and production of machine tools needed for peacetime conversion will be seriously affected unless manpower consideration is given the machine tool industry, the Machine Tool Industry Advisory Committee warned at its recent meeting.

Committee members stressed the fact that re-employment in the automotive and other peacetime industries depends upon the early supply of machine tools.

Manpower assistance has not been given to the industry this year, nor has it received deferments for key personnel, members of the industry committee emphasized.

The backlog of unfilled rated orders for machine tools on Aug. 31, 1944, amounted to $195,000,000, WPB officials said. While this represents a decline from the backlog of $211,000,000 on Dec. 31, 1943, the present backlog is substantially above that of the low point of $153,563,000 on March 31, 1944.

• Reflecting an increase of 7 per cent, August shipments of machine tools were valued at $35,041,000 as compared with $32,753,000 in July, according to WPB. The value of net new orders received (total orders less cancellations) increased to $40,024,000, or 25.5 per cent above July. The backlog of unfilled orders was $195,818,000 at the end of August, or 2.4 per cent above the July total of $191,295,000. Firm orders received in August totaled $42,376,000, an increase of nearly 18 per cent over the July total of $35,959,000. August cancellations were $2,352,000, a decrease of 42 per cent from the July total of $4,070,000.



Source: War Production Board *The Iron Age*

WHEN LIFE HANGS BY A THREAD ...

Precision Counts

THE failure of a single thread in today's super-powered fighting planes may mean the death of a crew of brave American airmen battling in the clouds.

With this sobering thought constantly before us, we, of Cadillac, feel that we would be guilty of criminal negligence were we to be satisfied with anything less than the highest degree of perfection humanly attainable in the manufacture of the thread gages so extensively used in the inspection of vital aircraft parts.

When life hangs by a thread, precision counts!

CADILLAC

Thread Plug

GAGES

CADILLAC GAGE COMPANY, *Detroit*

NON-FERROUS METALS

. . . News and Market Activities

Magnesium Released for Civilian Use

Washington

• • • **Government controls on the use of magnesium** for civilian products have been dropped by revocation of Preference Order M-2-b. This was attributed by the WPB Aluminum and Magnesium Div. to the fact that restrictions are no longer necessary to protect the military program, particularly after the recent reductions in the production schedules of the aircraft industry, the principal consumer.

Simultaneously with revocation of the controlling magnesium order, WPB issued M-2-c, which provides that all restrictions on the use of magnesium contained in other WPB orders no longer apply. However, restrictions in other orders respecting the quantity of an article that may be made or as to its size or type remain applicable even if the article is made wholly or partly of magnesium.

The new Order M-2-c states that persons wishing to obtain magnesium or magnesium products may place rated or unrated purchase orders on their supplier without securing approval of WPB or the Aircraft Scheduling Unit of the Aircraft Resources Control Office. Orders so placed are subject to the priorities regulations of WPB, particularly Priorities Regulation 1. The order calls for monthly reports to WPB by certain industries, such as those engaged in the production of virgin magnesium and some magnesium products and in the smelting of magnesium scrap.

PREDICTOR: *Dr. Willard H. Dow, president of Dow Chemical Co., predicts the use of magnesium wheels on most makes of automobiles. Should the automobile industry return to its prewar production, and only ¾ of the models use magnesium wheels, Dr. Dow has estimated that present total magnesium production capacity will be required. His address keynoted the First Annual Meeting of the Magnesium Association at the Waldorf-Astoria, New York City.*

o o o

Aluminum Scrap Minimums Set

Washington

• • • **Without waiting for the appointment** of the new three man board under the Surplus Property Act, retiring Surplus War Property Administrator William L. Clayton has placed a floor under the selling prices of various grades of government owned aluminum scrap. Action was taken under the pricing policy issued on April 21 for the sale of contract termination inventories. The new regulation bars the sale of the scrap in this country at prices below those set, and is in line with the policy to stop sales of scrap where prices have dropped to unsatisfactory levels. Huge accumulations of aluminum scrap are responsible for the regulation whose issuance, Mr. Clayton said, was necessary to prevent demoralization of the market. He pointed out that unless restricted this situation could lead to distressed scrap falling into the hands of speculators at inadequate returns to the Government.

The established schedule of minimum sale prices per pound on aluminum scrap follows:

All segregated solids, 6c; all mixed solids, 5c; any scrap solids mixed with foreign materials, 4c; obsolete aircraft to be scrapped, sub-assemblies completed or partially completed to be scrapped, 2½c; wrecked aircraft, 1¼c.

The schedule applies to aluminum scrap available for sale in this country by the War Department and the Navy Department, both in their cost-plus-a-fixed-fee contracts and in inventories of contractors or subcontractors whose contracts with these agencies have been terminated. It also applies to any disposal agency handling scrap, principally RFC or its subsidiaries.

However, the minimum prices do not apply to lots of 10,000 lb. or less, to borings or turnings or to aluminum scrap in terminated contracts where the claim against the government is less than $10,000. These exempted items will continue to be disposed of in accordance with pre-existing regulations.

Any government owned aluminum scrap that cannot be sold at the minimum prices is to be withheld from the market pending further instructions. It will be turned over to RFC's Metals Reserve Co. for storage in accordance with provisions for storage and handling incorporated in the new regulation. In locations where storage space is not available, sales may continue until Oct. 15, under existing regulations, but no sales will be made from storage until further instructions are issued.

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Manganese

Steps are being taken to close down operation of the government owned manganese leaching plant at Las Vegas, Nev. The plant, operated by the Manganese Ore Co., has been producing Grade B manganese nodules. Its closing was determined upon in the interests of national economy, WPB has announced.

The plant to be closed is a high-cost, subsidized operation, it was explained. Accumulated stocks of a similar grade of manganese, together with more economical output from other sources were said to be adequate to supply the tonnage required for production of standard ferromanganese for use in the steel industry.

Primary Metals

(Cents per lb. unless otherwise noted)

Aluminum, 99+%, del'd. (Min. 10,000 lb.)	15.00
Antimony, American, Laredo, Tex.	14.50
Beryllium copper, 3.75-4.25% Be; dollars per lb. contained Be	$17.00
Cadmium, del'd.	90.00
Cobalt, 97-99% (per lb.)	$1.50 to $1.57
Copper, electro. Conn. valley	12.00
Copper, electro. New York	11.75
Copper, lake	12.00
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.5%, dollars per troy oz.	$7.50
Iridium, dollars per troy oz.	$165.00
Lead, St. Louis	6.35
Lead, New York	6.50
Magnesium, 99.9+%, carlots	20.50
Magnesium, 12-in. sticks, carlots	27.50
Mercury, dollars per 76-lb. flask, f.o.b. New York	$108 to $110.00
Nickel, electro	35.00
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per oz.	$35.00
Silver, open market, New York, cents per oz.	44.75
Tin, Straits, New York	52.00
Zinc, East St. Louis	8.25
Zinc, New York	8.67

Remelted Metals

(Cents per lb. unless otherwise noted)

Aluminum, No. 12 Fdy. (No. 2)	8.50 to 9.00
Aluminum, deoxidizing Nos. 2, 3, 4	6.25 to 9.00
Brass Ingot	
85-5-5-5 (No. 115)	13.25
88-10-2 (No. 215)	16.75
80-10-10 (No. 305)	16.00
No. 1 Yellow (No. 405)	10.25

Copper, Copper Base Alloys

(Mill base, cents per lb.)

	Extruded Shapes	Rods	Sheets
Copper	20.87	....	20.37
Copper, H.R.	....	17.37	....
Copper drawn	....	18.37	....
Low brass, 80%	....	20.40	20.15
High brass	....	....	19.48
Red brass, 85%	....	20.61	20.36
Naval brass	20.37	19.12	24.50
Brass, free cut	....	15.01	....
Commercial bronze, 90%	....	21.32	21.07
Commercial bronze, 95%	....	21.53	21.28
Manganese bronze	24.00	....	28.00
Phos. bronze, A, B, 5%	....	36.50	36.25
Muntz metal	20.12	18.87	22.75
Everdur, Herculoy, Olympic or equal	....	25.50	26.00
Nickel silver, 5%	....	28.75	26.50
Architect bronze	19.12	....	....

Aluminum

(Cents per lb., subject to extras on gage, size, temper, finish, factor number, etc.)

Tubing: 2 in. O.D. x 0.065 in. wall 2S, 40c. (½H); 52S, 61c. (O); 24S, 67½c. (T).

Plate: 0.250 in. and heavier: 2S and 3S, 21.2c.; 52S, 24.2c.; 61S, 22.8c.; 24S, 24.2c.

Flat Sheet: 0.188 in. thickness; 2S and 3S, 22.7c. a lb.; 52S, 26.2c.; 61S, 24.7c.; 24S, 26.7c.

2000-lb. base for tubing; 30,000-lb. base for plate, flat stock.

Extruded Shapes: "As extruded" temper; 2000-lb. base, 2S and 3S, factor No. 1 to 4, 25.5c.; 14S, factor No. 1 to 4, 35c.; 17S, factor No. 1 to 4, 31c.; 24S, factor No. 1 to 4, 34c.; 53S, factor No. 1 to 4, 28c.; 61S, factor No. 1 to 4, 28½c.

The factor is determined by dividing perimeter of shape by weight per lineal foot.

Wire Rod and Bar: Base price; 17ST and 11ST-3, screw machine stock. Rounds: ¼ in., 28½c. per lb.; ½ in., 26c.; 1 in., 24½c.; 2 in., 23c. Hexagonals; ¼ in., 34½c. per lb.; ½ in., 28½c.; 1 in., 25½c.; 2 in., 25½c. 2S, as fabricated, random or standard lengths, ¼ in., 24c. per lb.; ½ in., 25c.; 1 in., 24c.; 2 in., 23c. 24ST, rectangles and squares, random or standard lengths. 0.093-0.187 in. thick by 1.001-2.000 in. wide, 33c. per lb.; 0.751-1.500 in. thick by 2.001-4.000 in. wide, 29c.; 1.501-2.000 in. thick by 4.001-6.000 in. wide, 27½c.

Magnesium

Sheet, rod, tubes, bars, extruded shapes subject to individual quotations. Metal turnings: 100 lb. or more, 46c. a lb.; 25 to 90 lb., 56c.; less than 25 lb., 66c.

NON-FERROUS SCRAP METAL QUOTATIONS

†*(OPA basic maximum prices, cents per lb., f.o.b. point of shipment, subject to quality, quantity and special preparation premiums—other prices are current quotations)*

Copper, Copper Base Alloys

OPA Group 1†

No. 1 wire, No. 1 heavy copper	9.75
No. 1 tinned copper wire, No. 1 tinned heavy copper	9.75
No. 2 wire, mixed heavy copper	8.75
Copper tuyeres	8.75
Light copper	7.75
Copper borings	9.75
No. 2 copper borings	8.75
Lead covered copper wire, cable	6.00*
Lead covered telephone, power cable	6.04
Insulated copper	5.10*

OPA Group 2†

Bell metal	15.50
High grade bronze gears	13.25
High grade bronze solids	11.50*
Low lead bronze borings	11.50*
Babbitt lined brass bushings	13.00
High lead bronze solids	10.00*
High lead bronze borings	10.00*
Red trolley wheels	10.75
Tinny (phosphor bronze) borings	10.50
Tinny (Phosphor bronze) solids	10.50
Copper-nickel solids and borings	9.25
Bronze paper mill wire cloth	9.50
Aluminum bronze solids	9.00
Soft red brass (No. 1 composition)	9.00
Soft red brass borings (No. 1)	9.00
Gilding metal turnings	8.50
Contaminated gilded metal solids	8.50
Unlined standard red car boxes	8.25
Lined standard red car boxes	7.75
Cocks and faucets	7.75
Mixed brass screens	7.75
Red brass breakage	7.50
Old nickel silver solids, borings	6.25
Copper lead solids, borings	6.25
Yellow brass castings	6.25
Automobile radiators	7.00
Zincy bronze borings	8.00
Zincy bronze solids	8.00

OPA Group 3†

Fired rifle shells	8.25
Brass pipe	7.50
Old rolled brass	7.00
Admiralty condenser tubes	7.50
Muntz metal condenser tubes	7.00
Plated brass sheet, pipe reflectors	6.50
Manganese bronze solids	7.25[1]
Manganese bronze solids	6.25[2]
Manganese bronze borings	6.50[1]
Manganese bronze borings	5.50[2]

OPA Group 4†

Refinery brass	4.75*

*Price varies with analysis. [1] Lead content 0.00 to 0.40 per cent. [2] Lead content 0.41 to 1.00 per cent.

Other Copper Alloys†

Briquetted Cartridge Brass Turnings	8.625
Cartridge Brass Turnings, Loose	7.875
Loose Yellow Brass Trimmings	7.875

Aluminum

Plant scrap, segregated

2s solids	7.50
Dural alloys, solids 14, 17, 18, 24S	2.50
25S	3.00
turnings, dry basis	2.00
Low copper alloys 51, 52, 61, 63S solids	5.00
turnings, dry basis	3.00

Plant scrap, mixed

Solids	2.00
Turnings, dry basis	1.50

Obsolete scrap

Pure cable	7.50
Old sheet and utensils	4.00
Old castings and forgings	3.25
Pistons, free of struts	3.00
Pistons, with struts	1.50
Old alloy sheet	3.00

Magnesium

Segregated plant scrap

Pure solids and all other solids, exempt Borings and turnings	1.50

Mixed, contaminated plant scrap

Grade 1 solids	3.00
Grade 1 borings and turnings	2.00
Grade 2 solids	2.00
Grade 2 borings and turnings	1.00

Zinc

New zinc clippings, trimmings	6.00
Engravers, lithographers plates	6.00
Old zinc scrap	4.75
Unsweated zinc dross	5.00
Die cast slab	4.50
New die cast scrap	4.45
Radiator grilles, old and new	3.50
Old die cast scrap	3.00

Lead

Deduct 0.55c. a lb. from refined metal basing point prices or soft and hard lead inc. cable, for f.o.b. point of shipment price.

Nickel

Ni content 98+%, Cu under ½%, 26c. per lb.; 90 to 98% Ni, 26c. per lb. contained Ni.

ELECTROPLATING ANODES AND CHEMICALS

Anodes

(Cents per lb., f.o.b. shipping point)

Copper: Cast, elliptical, 15 in. and longer	25⅛
Electrolytic, full size	22⅞
cut to size	30⅛
Rolled, oval, straight, 15 in. and longer	23¼
Curved	24¼
Brass Cast, 82-20, elliptical, 15 in. and longer	23⅝
Zinc: Cast, 99.99, 16 in. and over	16¼
Nickel: 99% plus, cast	47
Rolled, depolarized	48
Silver: Rolled, 999 fine per Troy (1-9) oz., per oz.	58

Chemicals

(Cents per lb., delivery from New York)

Copper cyanide, tech., 100-lb. bbls. 1-5	5.65
Copper sulphate, 99.5 crystals, bbls.	13.00-13.50
Nickel salts, single, 425-lb. bbls.	34.00
Silver cyanide, 100 oz., lots	40.82-41.125
Sodium cyanide, 96% dom., 100-lb. dms.	0.15
Zinc cyanide, 100-lb. dms.	32.00
Zinc, sulphate, 89% crystals, bbls.	6.80

SCRAP

. . . News and Market Activities

Scrap Trends Seen Marking Time

• • • This week the scrap market is in a transition period in which buyers and dealers seem to be marking time to see whether prices will drop to lower levels or will be stabilized at current values. There are changes in all districts required to obtain proper readjustment of grade differentials. The Detroit report seems to indicate a coming pick-up in scrap trade even at somewhat lower prices this week. This is a hopeful sign since the industry has been without a reasonable amount of business for a long time.

No one, it is believed, could come into today's market to buy any large tonnages of scrap at current prices without an immediate increase in prices.

Talk of floors on ferrous scrap is being discounted in Pittsburgh, but their threat is a serious one if OPA should decide to place them in effect. While OPA couldn't control all scrap, it could place floors on that owned by the government. With war production at present levels, a floor would include a very large percentage of the scrap that is being generated since the government owns the bulk of the metal being processed. Of course, this couldn't include railroad scrap which is now quite substantial, but pressure could be brought to bear on railroads to keep their prices up. In fact they would be inclined to do that without any pressure since they have been able to hold prices above those of industrial scrap in the face of the current falling market.

•

PITTSBURGH — There is a general firming tendency in the scrap market here, both because of new buying and because of dealers' selling resistance. This bolstering effect might well result in an about face in the trend of prices, which for the past six weeks have been downward. However there has not been enough activity to bring about an upward movement as yet. The changes that occur in the next several weeks may well be, for the most part, corrections of discrepancies between grades, bringing price differentials into line and properly evaluating normal spreads between grades. There was a bit of a slackening off in the volume of government owned scrap such as arsenal and shipyard material coming into this market this week. Also it is understood here that all imports of battlefield scrap have been discontinued. There has been very little in the way of a turnover of this scrap in the Pittsburgh area, mainly because of its unknown quality.

•

CHICAGO — With the exception of small purchases of blast furnace and specialty grades, no mill buying activity has taken place either to confirm or alleviate evident weaknesses. By the time this sees print, however, it is entirely possible that buying policy of a principal district consumer may be sufficiently well defined to clarify prices on principal grades. Such action it is expected will reflect weaker prices in other districts which have slightly tipped the scale on potential sources of supply here even though local heavy melting steel production is not so overpowering as elsewhere. Dealers' transactions show particular evidence of further weakness in machine shop turnings, with some distress sales below market arising from overproduction. Market for cast grades is subject to freight charges of $2.50 to $3.00 on better grades with little or no freight acceptable on less desirable items.

•

DETROIT — The first buying of any consequence, even though it was comparatively small, trickled through this market starting late last week. Some local users took both electric furnace and blast furnace grades, and shipments by boat to Cleveland and Buffalo were made. These various sales made possible a more definite set of quotations than have existed for some time. They indicated a 50c. drop in open hearth grades from last week and reduction in some of the less wanted blast furnace grades. Electric furnace scrap was definitely off on the basis of the thin business.

•

BOSTON—The drop in heavy melting steel values apparently has been checked. Not much, but enough No. 1 is selling at $10 a ton on cars, and No. 2 at $9 to establish a market. In contrast, borings and turnings markets are unstable. To illustrate, offers for mixed borings and turnings run as low as $3.50 a ton and as high as $4.75, while about the only actual business is at $5.25. Quotations for turnings in general mean little due to a lack of actual sales. Sales for October shipment of No. 1 chemical borings are reported on a basis of $13.06 to $14.15 a ton.

•

BUFFALO—Purchases of No. 1 heavy melting scrap in the local market at $17 a ton by one of the leading consumers appear to confirm present price levels. On the other hand, a small sale of No. 2 heavy melting and No. 2 bundles, reported at $13.50 a ton, was perplexing. This transaction was said to be a sale of distressed stocks and was not a true reflection of prices. Dealers and consumers generally agree that the Buffalo market has followed declines in other centers to a lesser extent than had been anticipated.

CINCINNATI — District scrap dealers indicate that there are a few orders at the present price levels, but that there is not much material coming into the market at present prices. As a matter of fact, except for consumers' inventory, dealers indicate that there is no great accumulation anywhere and there is no justification for the present low prices. Rails and cast scrap, however, appear to be still fairly strong, but other items continue to be weak.

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ST. LOUIS — Railroad lists of scrap iron have again become competitive for the first time since price regulations became effective. The pending lists include Wabash, 1500 tons; St. Louis-San Francisco, 500 tons; St. Louis-Southwestern, 700 tons; Missouri-Kansas & Texas, 700 to 800 tons.

•

NEW YORK — The scrap market in this area is quiet. There are few current sales and no changes in prices. One of the few buying mills has returned to its own scrap specifications and is applying them rigidly to incoming shipments. Dealers' scrap stocks are said to be lower than they have been for years.

•

PHILADELPHIA—Several mills here have made some scrap purchases although there are a few consumers who are still observing the price trend before reentering the market. Dealers have practically dried up as a source, and shipments from yards are scanty. Although there have been reported sales at $14.50 for No. 1 heavy melting, some mills here have received quotations of $15.50 as the price of No. 1. Although several have accepted this, others are holding out for a lower price. Low phos plate has declined 50c., to $18.25 to $18.75. Cast grades continue strong with new orders placed at ceiling prices.

•

CLEVELAND—No interest has been evidenced by consumers in this area, nor in the valley, to any great extent. What sales have been made have been very small, and the price has dropped another 50c. per ton on No. 1 in both districts. One Cleveland mill has just about rounded out its lake shipments, with three boatloads of scrap coming in this week.

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BIRMINGHAM — The scrap market here has developed further weaknesses with rails showing additional price declines ranging as much as $1 per ton. Few purchases of any grade are being made and principal mill consumers remain out of the market.

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LOS ANGELES—Representative quantities of open hearth grade scrap are now moving at $2.00 below ceiling from dealers here. Irregular shipments of offshore scrap from Hawaii and combat zones are offered by the Navy through dealers on a negotiated basis, because the shipments must be promptly unloaded and consigned immediately to dealers.

[Going prices as obtained in the trade by IRON AGE editors, based on representative tonnages (for ceiling prices see O. P. A. schedule No. 4).]

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melt	$16.00 to $16.50
RR. hvy. melt	17.00 to 17.50
No. 2 hvy. melt	15.00 to 15.50
RR. scrap rails	21.50
Rails 3 ft. and under	23.50
Compre'd sheets, new	16.00 to 16.50
Hand bdld. sheets	15.50 to 16.00
Hvy. axle turn.	15.50 to 16.00
Mach. shop turn.	8.50 to 9.00
Hvy. steel forge turn.	15.50 to 16.00
Short shov. turn.	12.00 to 12.50
Mixed bor. and turn.	8.50 to 9.00
Hvy. break. cast	16.50 plus frt.
Cast iron borings	11.00 to 11.50
No. 1 cupola	20.00 plus frt.
RR. knuck. and coup.	21.50 to 22.00
RR. coil springs	21.50 to 22.00
Rail leaf springs	21.50 to 22.00
Rolled steel wheels	21.50 to 22.00
Low phos. billet crops	24.00 to 25.00
Low phos.	19.50 to 20.00
RR malleable	22.00 plus frt.

CHICAGO

Per gross ton delivered to consumer

No. 1 hvy. melting	$17.25 to $17.75
No. 2 hvy. melting	16.25 to 16.75
No. 1 bundles	16.25 to 16.75
No. 2 dealers' bndls.	15.25 to 15.75
Bndld. mach. shop turnings	15.25 to 15.75
Galv. bundles (No. 3)	13.25 to 13.75
Mach. shop turnings	8.50 to 9.00
Short shoveling trngs.	9.50 to 10.00
Cast iron borings	9.00 to 9.50
Mix. bor. & short turn.	9.00 to 9.50
Low phos. hvy. forge	19.50 to 20.00
Low phos. plates	18.50 to 18.75
No. 1 RR hvy. mltng.	18.75
Reroll rails	22.25
Cut rails, 3 ft. and under	21.25 to 21.75
Locomotive tires, cut	18.75 to 19.25
frames	18.25 to 18.75
Cut bolsters & side frames	18.75 to 19.25
Angles & splice bars	19.75 to 20.25
No. 3 steel wheels	19.50 to 20.00
Couplers & knuckles	19.00 to 19.50
Cut rails, 2 ft. and under	23.00 to 23.50
Miscellaneous rails	19.25 to 19.75
Agricul. malleable	19.50 to 20.00
RR. malleable	20.50 to 21.00
St'dard stl. car axles	23.00 to 23.50
FOB shipping point	
No. 1 mach. cast	20.00
No. 1 agricul. cast	20.00
Cast iron car wheels	20.00
Hvy. breakable cast	16.50
RR grate bars	15.25
Brake shoes	15.25
Stove plate	19.00
Clean auto cast	20.00

CINCINNATI

Per gross ton delivered to consumer:

No. 1 hvy. melting	$15.50 to $16.00
No. 2 hvy. melting	14.50 to 15.00
No. 1 bundles	15.50 to 16.00
No. 2 bundles	13.50 to 14.00
Mach. shop turnings	6.00 to 6.50
Shoveling turnings	7.00 to 7.50
Cast iron borings	7.50 to 8.00
Mixed bor. & turns.	6.00 to 6.50
No. 1 cupola cast	21.00
Hvy. breakable cast	16.50
Low phos. plate	20.00 to 21.00
Scrap rails	20.00 to 21.00
Stove plate	16.00 to 16.50

BOSTON

Dealers' buying prices per gross ton, f.o.b. cars

No. 1 hvy. melting	$10.00
No. 2 hvy. melting	9.00
Bundled skeleton	9.00
Turnings, shovelings	$6.50 to 7.00
Turnings, regular	5.00 to 5.50
Mixed. bor. & turns.	4.75 to 5.25
Mixed alloy turnings	3.50 to 4.00
Clean cast chem. bor.	13.06 to 14.15
Delivered to fdry. per gr. ton	
Breakable cast	21.87 to 21.87
Stove plate	20.00 to 23.51
Machinery cast, truck	21.00 to 23.51

DETROIT

Per gross ton, brokers' buying prices:

No. 1 hvy. melting	$11.00 to $11.50
No. 1 hyd. comp. sh'ts	11.00 to 11.50
No. 2 hvy. melting	11.00 to 11.50
No. 1 bundles	11.00 to 11.50
New busheling	11.00 to 11.50
Mach. shop turnings	5.00 to 5.50
Short shov. turnings	6.25 to 6.75
Cast iron borings	5.75 to 6.25
Mixed bor. & turns.	5.00 to 5.50
No. 1 cupola cast	19.00 to 20.00
Charging box cast	14.50 to 15.50
Hvy. breakable cast	13.00 to 13.50
Stove plate	17.00 to 17.50
Flashings	11.00 to 11 50
Low phos. plate	14.00 to 15.00
Automotive cast	19.00 to 20.00

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	$14.50
No. 2 hvy. melting	13.50
No. 2 bundles	12.50
Mach. shop turnings	$10.00 to 10.50
Shoveling turnings	12.75 to 13.00
Cast iron borings	12.00 to 12.50
Mixed bor. & turns.	10.00 to 10.50
No. 1 cupola cast	20.00 plus frt.
Hvy. breakable cast	16.50 plus frt.
Cast, charging box	19.00 plus frt.
Hvy. axle, forge turn.	16.25 to 16.75
Low phos. plate	18.25 to 18.75
Low phos. punchings	19.75 to 20.25
Billet crops	18.25 to 18.75
RR. steel wheels	19.50 to 20.00
RR. coil springs	19.50 to 20.00
RR. malleable	22.00 plus frt.

ST. LOUIS

Per gross ton delivered to consumer:

Hvy. melting	$16.50
No. 1 locomotive tires	$16.00 to 16.50
Misc. stand. sec. rails	17.00 to 17.50
Railroad springs	17.00 to 18.00
Bundled sheets	15.00
Heavy turnings	9.00
Rerolling rails	21.00
Steel car axles	23.50
Steel rails under 3 ft.	21.50
Steel angle bars	18.00
Cast iron car wheels	20.00
No. 1 machinery cast	20.00
Railroad malleable	20.00 to 20.50
Breakable cast	16.50
Stove plate	17.00
Grate bars	15.25
Brake shoes	15.25

Note: Cast grades f.o.b. Shipping Point.

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting	$14.50 to $15.00
No. 2 hvy. melting	14.50 to 15.00
No. 2 bundles	13.50 to 14.00
No. 1 busheling	11.50 to 12.00
Scrap rails	14.00 to 14.50
Rails for rerolling	17.00 to 17.50
Rails 3 ft. & under	17.00 to 17.50
Angles & splice bars	16.50 to 17.00
Long turnings	4.50 to 5.00
Cast iron borings	6.50 to 7.00
Steel axles	14.50 to 15.00
Stove plate	16.50 to 17.00
Bar crops and plate	16.00 to 16.50
Structural and plate	16.00 to 16.50
No. 1 cast	20.00 to 21.00
Cast iron carwheels	13.00 to 13.50

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	$16.00 to $16.50
No. 2 hvy. melting	16.00 to 16.50
Low phos. plate	17.50 to 18.50
No. 1 busheling	16.00 to 16.50
Hydraulic bundles	16.00 to 16.50
Mach. shop turnings	9.00 to 9.50
Short shovel. trngs.	11.50
Cast iron borings	11.50 to 12.00

NEW YORK

Dealers' buying prices, per gross ton, on cars:

No. 1 hvy. melting	$11.50 to $12.00
No. 2 hvy. melting	10.50 to 11.00
Hyd. comp. black bundles	9.50 to 10.00
Hyd. comp. galv. bundles	7.50 to 8.00
Hvy. breakable cast	16.50
Charging box cast	19.00
No. 1 cupola cast	20.00
Clean auto cast	20.00
Unstrip. motor blks.	17.50
Stove plate	19.00
Clean chem. cast bor.	14.33
Mach. shop turnings	6.00 to 6.50
Mixed bor. & turns.	6.00 to 6.50

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$17.00 to $18.00
No. 1 bundles	16.00 to 16.50
No. 2 bundles	15.00 to 15.50
No. 2 hvy. melting	16.00 to 16.50
Mach. shop turnings	9.00 to 9.50
Shoveling turnings	11.00 to 11.50
Cast iron borings	11.00 to 11.50
Mixed bor. & turns.	11.00 to 11.50
No. 1 cupola cast	20.80 to 22.50
Stove plate	19.80 to 21.50
Low phos. plate	21.75
Scrap rails	19.00 to 19.25
Rails 3 ft. & under	22.75
RR steel wheels	23.75
Cast iron car wheels	20.00
RR coil & leaf sprgs.	23.75
RR knuckles & coup.	23.75
RR malleable	22.00
No. 1 busheling	16.00 to 16.50

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	$15.50 to $16.00
No. 2 hvy. melting	15.50 to 16.00
Compressed sheet stl.	15.50 to 16.00
Drop forge flashings	15.50 to 16.00
No. 2 bundles	14.50 to 15.00
Mach. shop turnings	6.50 to 7.50
Short shovel. trngs.	11.00 to 12.00
No. 1 busheling	15.00 to 15.50
Steel axle turnings	15.00 to 15.50
Low phos. billet and bloom crops	20.00 to 21.00
Cast iron borings	11.00 to 12.00
Mixed bor. & turns.	11.00 to 11.50
No. 2 busheling	13.00 to 13.50
No. 1 machine cast	20.00 plus frt.
Railroad cast	20.00 plus frt.
Railroad grate bars	15.25
Stove plate	19.00 plus frt.
RR. hvy. melting	17.00 to 17.50
Rails 3 ft. & under	23.00
Rails 18 in. & under	24.25
Rails for rerolling	23.50
Railroad malleable	22.00 plus frt.
Elec. furnace punch.	18.50 to 19.50

SAN FRANCISCO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$16.00 to $16.75
RR hvy. melting	16.00 to 16.75
No. 2 hvy. melting	15.00 to 15.75
No. 2 bales	14.00 to 14.75
No. 3 bales	10.00
Mach. shop turnings	6.00 to 7.00
Elec. furn. 1 ft., under	17.00 to 19.50
No. 1 cupola cast	21.00 to 24.00

LOS ANGELES

Per gross ton delivered to consumer:

No. 1 hvy. melting	$15.00 to $16.50
No. 2 hvy. melting	14.00 to 15.50
No. 2 bales	13.00 to 14.50
No. 3 bales	10.00
Mach. shop turnings	4.00 to 5.00
No. 1 cupola cast	20.00 to 23.00

SEATTLE

Per gross ton delivered to consumer:

No. 1 hvy. melting	$14.50
RR hvy. melting	14.50
No. 3 bundles	12.50
Elec. furn. 1 ft., under	$16.00 to 17.00
No. 1 cupola cast	20.00 to 22.00

Comparison of Prices . . .

Advances Over Past Week in **Heavy Type**; Declines in *Italics*. (Prices Are F.O.B. Major Basing Points)

Flat Rolled Steel: (Cents Per Lb.)	Oct. 10, 1944	Oct. 3, 1944	Sept. 5, 1944	Oct. 12, 1943
Hot rolled sheets	2.10	2.10	2.10	2.10
Cold rolled sheets	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip	2.10	2.10	2.10	2.10
Cold rolled strip	2.80	2.80	2.80	2.80
Plates	2.10	2.10	2.10	2.10
Plates, wrought iron	3.80	3.80	3.80	3.80
Stain's c.r. strip (No. 302)	28.00	28.00	28.00	28.00
Tin and Terne Plate: (Dollars Per Base Box)				
Tin plate, standard cokes	$5.00	$5.00	$5.00	$5.00
Tin plate, electrolytic	4.50	4.50	4.50	4.50
Special coated mfg. ternes	4.30	4.30	4.30	4.30
Bars and Shapes: (Cents Per Lb.)				
Merchant bars	2.15	2.15	2.15	2.15
Cold finished bars	2.65	2.65	2.65	2.65
Cold finished bars	2.65	2.65	2.65	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Stainless bars (No. 302)	24.00	24.00	24.00	24.00
Wrought iron bars	4.40	4.40	4.40	4.40
Wire and Wire Products: (Cents Per Lb.)				
Plain wire	2.60	2.60	2.60	2.60
Wire nails	2.55	2.55	2.55	2.55
Rails: (Dollars Per Gross Ton)				
Heavy rails	$40.00	$40.00	$40.00	$40.00
Light rails	40.00	40.00	40.00	40.00
Semi-Finished Steel: (Dollars Per Gross Ton)				
Rerolling billets	$34.00	$34.00	$34.00	$34.00
Sheet bars	34.00	34.00	34.00	34.00
Slabs, rerolling	34.00	34.00	34.00	34.00
Forging billets	40.00	40.00	40.00	40.00
Alloy blooms, billets, slabs	54.00	54.00	54.00	54.00
Wire Rods and Skelp: (Cents Per Lb.)				
Wire rods	2.00	2.00	2.00	2.00
Skelp	1.90	1.90	1.90	1.90

Pig Iron: (Per Gross Ton)	Oct. 10, 1944	Oct. 3, 1944	Sept. 5, 1944	Oct. 12, 1943
No. 2 fdy., Philadelphia	$25.84	$25.84	$25.84	$25.84
No. 2, Valley furnace	24.00	24.00	24.00	24.00
No. 2, Southern Cin'ti	25.11	25.11	25.11	24.68
No. 2, Birmingham	20.38	20.38	20.38	20.38
No. 2, foundry, Chicago†	24.00	24.00	24.00	24.00
Basic, del'd eastern Pa.	25.34	25.34	25.34	25.39
Basic, Valley furnace	23.50	23.50	23.50	23.50
Malleable, Chicago†	24.00	24.00	24.00	24.00
Malleable, Valley	24.00	24.00	24.00	24.00
L. S. charcoal, Chicago	37.34	37.34	37.34	31.34
Ferromanganese‡	135.00	135.00	135.00	135.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.
‡For carlots at seaboard.

Scrap: (Per Gross Ton)	Oct. 10, 1944	Oct. 3, 1944	Sept. 5, 1944	Oct. 12, 1943
Heavy melt'g steel, P'gh	$16.25	$16.25	$19.76	$20.00
Heavy melt'g steel, Phila.	14.50	14.50	18.00	18.75
Heavy melt'g steel, Ch'go	17.50	17.50	18.75	18.75
No. 1 hy. comp. sheet, Det.	11.75	11.75	15.25	17.85
Low phos. plate, Youngs'n	*18.00*	19.00	20.50	22.50
No. 1 cast, Pittsburgh	20.00*	21.50	20.00	20.00
No. 1 cast, Philadelphia	20.00*	22.75	20.00	20.00
No. 1 cast, Chicago	20.00*	22.17	20.00	20.00

*F.o.b. shipping point.

Coke, Connellsville: (Per Net Ton at Oven)	Oct. 10, 1944	Oct. 3, 1944	Sept. 5, 1944	Oct. 12, 1943
Furnace coke, prompt	$7.00	$7.00	$7.00	$6.50
Foundry coke, prompt	8.25	8.25	8.25	7.50

Non-Ferrous Metals: (Cents per Lb. to Large Buyers)	Oct. 10, 1944	Oct. 3, 1944	Sept. 5, 1944	Oct. 12, 1943
Copper, electro., Conn.	12.00	12.00	12.00	12.00
Copper, Lake	12.00	12.00	12.00	12.00
Tin (Straits), New York	52.00	52.00	52.00	52.00
Zinc, East St. Louis	8.25	8.25	8.25	8.25
Lead, St. Louis	6.35	6.35	6.35	6.35
Aluminum, Virgin, del'd.	15.00	15.00	15.00	15.00
Nickel, electrolytic	35.00	35.00	35.00	35.00
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	14.50	14.50	14.50	14.50

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 183-191.

Composite Prices . . .

Starting with the issue of April 22, 1943, the weighted finished steel price index was revised for the years 1941, 1942 and 1943. See explanation of the change on page 90 of the April 22, 1943, issue.

	FINISHED STEEL	PIG IRON	SCRAP STEEL
October 10, 1944	2.25513c. a Lb.	$23.61 a Gross Ton	$16.08 a Gross Ton
One week ago	2.25513c. a Lb.	$23.61 a Gross Ton	$16.08 a Gross Ton
One month ago	2.25513c. a Lb.	$23.61 a Gross Ton	$18.84 a Gross Ton
One year ago	2.26190c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton

	FINISHED STEEL HIGH	FINISHED STEEL LOW	PIG IRON HIGH	PIG IRON LOW	SCRAP STEEL LOW	SCRAP STEEL HIGH
1943	2.25513c.,	2.25513c.,	$23.61	$23.61	$19.17	$19.17
1942	2.26190c.,	2.26190c.,	23.61	23.61	19.17	19.17
1941	2.43078c.,	2.43078c.,	$23.61, Mar. 20	$23.45, Jan. 2	$19.17, Apr. 10	$22.00, Jan. 7
1940	2.30467c., Jan. 2	2.24107c., Apr. 16	23.45, Dec. 23	22.61, Jan. 2	16.04, Apr. 9	21.83, Dec. 30
1939	2.35367c., Jan. 3	2.26689c., May 16	22.61, Sept. 19	20.61, Sept. 12	14.08, May 16	22.50, Oct. 3
1938	2.58414c., Jan. 4	2.27207c., Oct. 18	23.25, June 21	19.61, July 6	11.00, June 7	15.00, Nov. 22
1937	2.58414c., Mar. 9	2.32263c., Jan. 4	23.25, Mar. 9	20.25, Feb. 16	12.67, June 8	21.92, Mar. 30
1936	2.32263c., Dec. 28	2.05200c., Mar. 10	19.74, Nov. 24	18.73, Aug. 11	12.67, June 9	17.75, Dec. 21
1935	2.07642c., Oct. 1	2.06492c., Jan. 8	18.84, Nov. 5	17.83, May 14	10.33, Apr. 29	13.42, Dec. 10
1934	2.15367c., Apr. 24	1.95757c., Jan. 2	17.90, May 1	16.90, Jan. 27	9.50, Sept. 25	13.00, Mar. 13
1933	1.95578c., Oct. 3	1.75836c., May 2	16.90, Dec. 5	13.56, Jan. 3	6.75, Jan. 3	12.25, Aug. 8
1932	1.89196c., July 5	1.83901c., Mar. 1	14.81, Jan. 5	13.56, Dec. 6	6.43, July 5	8.50, Jan. 12
1931	1.99626c., Jan. 13	1.86586c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	8.50, Dec. 29	11.33, Jan. 6
1930	2.25488c., Jan. 7	1.97319c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	11.25, Dec. 9	15.00, Feb. 18
1929	2.31773c., May 28	2.26498c., Oct. 29	18.71, May 14	18.21, Dec. 17	14.08, Dec. 3	17.58, Jan. 29

Weighted index based on steel bars, beams, tank plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 per cent of the United States output. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Finished Iron and Steel Prices . . .

Steel prices shown here are f.o.b. basing points, in cents per lb., unless otherwise indicated. Extras apply. Delivered prices do not reflect 3% tax on freight. (1) Mill run sheet, 10c. per lb. under base; primes 25c. above base. (2) Unassorted 8-lb. coating. (3) Widths up to 12-in. (4) 0.25 carbon and less. (5) Applies to certain width and length limitations. (6) For merchant trade. (7) For straight length material only from producer to consumer. Discount of 25c. per 100 lb. to fabricators. (8) Also shafting. For quantities of 20,000 to 29,999 lb. (9) Carload lot in manufacturing trade. (10) Prices do not apply if rail and water is not used. (12) Boxed. (13) Portland and Seattle price, San Francisco 2.50c. (14) This base price for annealed, bright finish wires, commercial spring wire.

Basing Point → / Product ↓	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio	Gulf Ports, Cars	Provo, Utah	[10] Pacific Ports, Cars	DELIVERED TO Detroit	New York	Philadelphia
Hot Rolled Sheets	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢			2.65¢	2.20¢	2.34¢	2.27¢
Cold Rolled Sheets[1]	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢			3.70¢	3.15¢	3.39¢	3.37¢
Galv. Sheets (24 gage)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢			4.05¢		3.74¢	3.67¢
Enameling Sheets (20 gage)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢			4.00¢	3.45¢	3.71¢	3.67¢
Long Ternes[3]	3.80¢	3.80¢	3.80¢										4.55¢		4.16¢	4.12¢
Hot Rolled Strip[3]	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢			2.75¢	2.20¢	2.46¢	
Cold Rolled Strip[4]	2.80¢	2.90¢		2.80¢			2.80¢	(Worcester = 3.00¢)						2.90¢	3.16¢	
Cooperage Stock Strip	2.20¢	2.20¢			2.20¢		2.20¢								2.56¢	
Commodity C-R Strip	2.95¢	3.05¢		2.95¢			2.95¢	(Worcester = 3.35¢)						3.05¢	3.31¢	
Coke Tin Plate, Base Box	$5.00	$5.00	$5.00						$5.10						5.36¢	5.32¢
.50 Electro Tin Plate, Box	$4.50	$4.50	$4.50						$4.60							
.75 Electro Tin Plate, Box	$4.65		$4.65						$4.75							
Black Plate (29 gage)[5]	3.05¢	3.05¢	3.05¢						3.15¢				4.05¢[12]			3.37¢
Mfg. Ternes, Special Box	$4.30	$4.30	$4.30						$4.40							
Carbon Steel Bars	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		(Duluth = 2.25¢)			2.50¢		2.80¢	2.25¢	2.49¢	2.47¢
Rail Steel Bars[6]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢					2.50¢		2.80¢			
Reinforcing (Billet) Bars[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.50¢		2.55¢[12]	2.25¢	2.39¢	
Reinforcing (Rail) Bars[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.50¢		c2.55¢[12]	2.25¢		2.47¢
Cold Finished Bars[8]	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢		(Detroit = 2.70¢)				(Toledo = 2.80¢)			2.99¢	2.97¢
Alloy Bars, Hot Rolled	2.70¢	2.70¢				2.70¢	(Bethlehem, Massillon, Canton = 2.70¢)							2.80¢		
Alloy Bars, Cold Drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢								3.45¢		
Carbon Steel Plates	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	(Coatesville and Claymont = 2.10¢) 2.10¢	2.35¢		2.45¢	2.60¢	2.65¢	2.32¢	2.29¢	2.15¢
Floor Plates	3.35¢	3.35¢									3.70¢		4.00¢		3.71¢	3.67¢
Alloy Plates	3.50¢	3.50¢			(Coatesville = 3.50¢)						3.95¢		4.15¢		3.70¢	3.59¢
Structural Shapes	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢		(Bethlehem = 2.10¢)			2.45¢		2.75¢		2.27¢	2.215¢
SPRING STEEL, C-R 0.26 to 0.50 Carbon	2.80¢			2.80¢			(Worcester = 3.00¢)									
0.51 to 0.75 Carbon	4.30¢			4.30¢			(Worcester = 4.50¢)									
0.76 to 1.00 Carbon	6.15¢			6.15¢			(Worcester = 6.35¢)									
1.01 to 1.25 Carbon	8.35¢			8.35¢			(Worcester = 8.55¢)									
Bright Wire[14]	2.60¢	2.60¢		2.60¢	2.60¢		(Worcester = 2.70¢)		(Duluth = 2.65¢)				3.10¢			2.92¢
Galvanized Wire	Add proper size extra and galvanizing extra to Bright Wire base															
Spring (High Carbon)	3.20¢	3.20¢		3.20¢			(Worcester = 3.30¢)						3.70¢			3.52¢
Steel Sheet Piling	2.40¢	2.40¢				2.40¢							2.95¢			2.72¢

EXCEPTIONS TO PRICE SCHED. NO. 6

Slabs—Andrews Steel Co. $41 basing pts.; Wheeling Steel Corp. (rerolling) 4 in. sq. or larger $37.75 f.o.b. Portsmouth, Ohio; Empire Sheet & Tin Plate Corp. $41; Phoenix Iron Co. (rerolling) $41, (forging) $47; Granite City Steel $47.50.

Blooms—Phoenix Iron Co. (rerolling) $41, (forging) $47; Pgh. Steel Co. (reroll) $38.25, (forging) $44.25. Wheeling Steel Corp. (rerolling) 4 in. sq. or larger $37.75 f.o.b. Portsmouth.

Sheet Bar—Empire Sheet & Tin Plate Co. $39 mill; Wheeling Steel Corp. $38 Portsmouth, Ohio.

Billets, Forging—Andrews Steel Co. $50 basing pts.; Follansbee Steel Corp. $49.50 Toronto; Phoenix Iron Co. $47.00 mill. Geneva Steel Co. $64.64 f.o.b. Pacific Coast; Pittsburgh Steel Co. $49.50.

Billets, Rerolling—Continental Steel Corp. may charge Acme Steel in Chicago switching area $34 plus freight from Kokomo, Ind.; Northwestern Steel & Wire Co. (Lend-Lease) $41 mill; Wheeling Steel Corp., 4 in. sq. or larger $37.75, smaller $39.50 f.o.b. Portsmouth, Ohio; Stanley Works may sell Washburn Wire Co. under allocation at $39 Bridgeport, Conn.; Keystone Steel & Wire Co. may sell Acme Steel Co. at Chicago base, f.o.b. Peoria; Phoenix Iron Co. $41 mill; Continental Steel Corp. (1¾ x 1¾) $39.50, (2 x 2) $40.60 Kokomo, Ind. (these prices include $1 size extra); Keystone Steel & Wire Co. $36.40 Peoria; Connors Steel Co. $50.69 Birmingham; Ford Motor Co. $34 Dearborn, Mich. Geneva Steel Co. $58.64 f.o.b. Pac. C. Pgh. Steel Co. $43.50.

Structural Shapes—Phoenix Iron Co. $2.35 basing pts. (export) $2.50 Phoenixville; Knoxville Iron Co. $2.30 basing points.

Rails—Sweet Steel Co. (rail steel) $50 mill; West Virginia Rail Co. (lightweight) on allocation based Huntington, W. Va.; Colorado Fuel & Iron Corp., $45 Pueblo.

Hot Rolled Plate—Granite City Steel Co. $2.65 mill; Knoxville Iron Co. $2.25 basing pts.; Kaiser Co. and Geneva Steel Co. $3.20 Pacific Ports; Central Iron & Steel Co. $2.50 basing points; Granite City Steel Co. $2.35 Granite City.

Merchant Bars—W. Ames Co., 10 tons and over, $2.85 mill; Eckels-Nye Steel Corp., $2.50 basing pts. (rail steel) $2.40; Phoenix Iron Co. $2.40 basing pts.; Sweet Steel Co. (rail steel) $2.35 mill; Joslyn Mfg. & Supply Co., $2.35 Chicago; Calumet Steel Div., Borg Warner Corp. (8 in. mill bars) $2.35 Chicago; Knoxville Iron Co. $2.30 basing pts. Laclede Steel Co., sales to LaSalle Steel granted Chicago base, f.o.b. Madison, Ill. Milton Mfg. Co. $2.75 f.o.b. Milton, Pa.

Pipe Skelp—Wheeling Steel Corp., Benwood, $2.05 per cwt.

Reinforcing Bars—W. Ames & Co., 10 tons and over, $2.85 mill; Sweet Steel Co. (rail steel) $2.35 mill; Columbia Steel Co. $2.50 Pacific Ports.

Cold Finished Bars—Keystone Drawn Steel Co. on allocation, Pittsburgh c.f. base plus c/l freight on hot rolled bars Pittsburgh to Spring City, Pa.; New England Drawn Steel Co. on allocation outside New England, Buffalo c.f. base plus c/l freight Buffalo to Massfield, Mass., f.o.b. Massfield; Empire Finished Steel Corp. on allocation outside New England, Buffalo c.f. base plus c/l freight Buffalo to plants f.o.b. plant; Compressed Steel Shafting Co. on allocation outside New England, Buffalo base plus c/l freight Buffalo to Readville, Mass. f.o.b. Readville; Medart Co. in certain areas, Chicago c.f. base plus c/l freight Chicago to St. Louis, f.o.b. St. Louis.

Alloy Bars—Texas Steel Co. for delivery except Texas and Okla. Chicago, base, f.o.b. Fort Worth, Tex.; Connors Steel Co. shipped outside Ala., Mississippi, Louisiana, Georgia, Florida, Tenn., Pittsburgh base, f.o.b. Birmingham.

Hot Rolled Strip—Joslyn Mfg. & Supply Co. $2.30 Chicago; Knoxville Iron Co. $2.25 basing pts.

Hot Rolled Sheets—Andrews Steel Co., Middletown base on shipments to Detroit or area; Parkersburg Iron & Steel Co., $2.25 Parkersburg.

Galvanized Sheets—Andrews Steel Co., $3.75 basing pts.; Parkersburg Iron & Steel Co. $3.85 Parkersburg; Apollo Steel Co. $3.75 basing pts.; Continental Steel Co., Middletown base on Kokomo, Ind., product; Superior Sheet Steel Co., Pittsburgh base except for Lend-Lease.

Pipe and Tubing—South Chester Tube Co. when priced at Pittsburgh, freight to Gulf Coast and Pacific Ports may be charged from Chester, Pa., also to points lying west of Harrisburg, Pa.

Black Sheets—Empire Sheet and Tinplate Co., maximum base price mill is $2.45 per 100 lb., with differentials, transportation charges, etc., provided in RPS. No. 6.

WAREHOUSE PRICES

Delivered metropolitan areas per 100 lb. These are zoned warehouse prices in conformance with latest zoning amendment to OPA Price Schedule 49.

Cities	SHEETS			STRIP		Plates ¼ in. and heavier	Structural Shapes	BARS		ALLOY BARS			
	Hot Rolled (10 gage)	Cold Rolled	Galvanized (24 gage)	Hot Rolled	Cold Rolled			Hot Rolled	Cold Finished	Hot Rolled, NE 8617-20	Hot Rolled NE 9442-45 Ann.	Cold Drawn, NE 8617-20	Cold Drawn, NE 9442-45 Ann.
**Philadelphia	3.518	4.872[8]	5.018a	3.922	4.772	3.605	3.666	3.822	4.072	5.966	7.066	7.272	8.322
New York	3.590	4.613[3]	5.010	3.974[6]	4.772	3.768	3.758	3.853	4.103	6.008	7.108	7.303	8.353
Boston	3.744	4.744[9]	5.224[9]	4.106	4.715	3.912	3.912	4.044	4.144	6.162	7.262	7.344	8.394
Baltimore	3.394	4.852	4.894	3.902	4.752	3.594	3.759	3.802	4.052	....	....	....	....
Norfolk	3.771	4.965	5.371	4.165	4.885	3.971	4.002	4.065	4.165	....	....	....	....
Chicago	3.25	4.20	5.231	3.60	4.65[17]	3.55	3.55	3.50	3.75	5.75	6.85	6.85	7.90
Milwaukee	3.387	4.337[3]	5.272[4]	3.737	4.787[17]	3.687	3.687	3.637	3 887	5.987	7.087	7.087	8.137
Cleveland	3.35	4.40	4.877[4]	3.60	4.45	3.40	3.588	3.35	3.75	5.956	7.056	6.85	7.90
Buffalo	3.35	4.40	4.75[4]	3.819	4.669	3.63	3.40	3.35	3.75	5.75	6.85	6.85	7.90
Detroit	3.45	4.50	5.00[4]	3.70	4.659[17]	3.609	3.661	3.45	3.80	6.08	7.18	7.159	8.209
Cincinnati	3.425	4.475[3]	4.825[3]	3.675	4.711	3.611	3.691	3.611	4.011	....	....	....	....
St. Louis	3.397	4.347[3]	5.172[4]	3.747	4.931[17]	3.697	3.897	3.647	4.031	6.131	7.231	7.231	8.281
Pittsburgh	3.35	4.40	4.75	3.60	4.45	3.40	3.40	3.35	3.75	5.75	6.85	6.85	7.90
St. Paul	3.51	4.48	5.257[4]	3.86	4.35[17]	3.813[3]	3.813[3]	3.763[3]	4.361	6.09	7.19	7.561	8.711
Omaha	3.865	5.443	5.608[4]	4.215	....	4.165	4.165	4.115	4.43	....	....	....	....
Indianapolis	3.58	3.58	4.568	4.918	3.768	4.78	3.63	3.58	3.98	8.08	7.18	7.18	8.23
Birmingham	3.45	....	4.75	3.70	....	3.55	3.55	3.50	4.43	....	....	....	....
Memphis	3.965[7]	4.66	3.265	4.215	....	4.065	4.065	4.015	4.33	....	....	....	....
New Orleans	4.058*	4.95	5.358	4.308	....	4.158	4.158*	4.108*	4.629	....	....	....	....
Houston	3.763	5.573	6.313[1]	4.313	....	4.25	4.25	3.75	8.373[3]	7.223	8.323	8.323	9.373
Los Angeles	5.00	7.20[2]	6.10[4]	4.95	5.613[15]	4.95	4.65	4.40	5.583	8.304	9.404	9.404	10.454
San Francisco	4.55[14]	7.30[4]	6.35[4]	4.50[14]	7.333[17]	4.6514	4.3514	4.1514	5.333	8.304	9.404	9.404	10.454
Seattle	4.65[12]	7.05[4]	5.95[4]	4.25[12]	....	4.7512	4.4512	4.3512	5.783	....	9.404	....	....
Portland	4.65[11]	6.60[4]	5.75[4]	4.75[11]	....	4.7511	4.4511	4.4511	5.533	8.304	9.404	8.304	9.404
Salt Lake City	4.53[17]	....	6.17[18]	5.53[17]	....	4.9817	4.9817	4.8817	5.90	....	....	....	....

MILL EXTRAS FOR NATIONAL EMERGENCY STEELS

Designation	Basic Open-Hearth		Electric Furnace		Designation	Basic Open-Hearth		Electric Furnace	
	Bars and Bar-Strip	Billets, Blooms, and Slabs	Bars and Bar-Strip	Billets, Blooms, and Slabs		Bars and Bar-Strip	Billets, Blooms, and Slabs	Bars and Bar-Strip	Billets, Blooms, and Slabs
NE 1330	0.10¢	$2.00	....	.....	NE 9415	0.75¢	$15.00	$1.25	$25.00
NE 1335	0.10	2.00	....	.....	NE 9417	0.75	15.00	1.25	25.00
NE 1340	0.10	2.00	....	.....	NE 9420	0.75	15.00	1.25	25.00
NE 1345	0.10	2.00	....	.....	NE 9422	0.75	15.00	1.25	25.00
NE 1350	0.10	2.00	....	.....	NE 9425	0.75	15.00	1.25	25.00
					NE 9427	0.75	15.00	1.25	25.00
					NE 9430	0.75	15.00	1.25	25.00
NE 8612	0.65¢	$13.00	$1.15	$23.00	NE 9432	0.75	15.00	1.25	25.00
NE 8615	0.65	13.00	1.15	23.00	NE 9435	0.75	15.00	1.25	25.00
NE 8617	0.65	13.00	1.15	23.00	NE 9437	0.75	15.00	1.25	25.00
NE 8620	0.65	13.00	1.15	23.00	NE 9440	0.75	15.00	1.25	25.00
NE 8622	0.65	13.00	1.15	23.00	NE 9442	0.80	16.00	1.30	26.00
NE 8625	0.65	13.00	1.15	23.00	NE 9445	0.80	16.00	1.30	26.00
NE 8627	0.65	13.00	1.15	23.00	NE 9447	0.80	16.00	1.30	26.00
NE 8630	0.65	13.00	1.15	23.00	NE 9450	0.80	16.00	1.30	26.00
NE 8632	0.65	13.00	1.15	23.00					
NE 8635	0.65	13.00	1.15	23.00					
NE 8637	0.65	13.00	1.15	23.00	NE 9722	0.65¢	$13.00	$1.15	$23.00
NE 8640	0.65	13.00	1.15	23.00	NE 9727	0.65	13.00	1.15	23.00
NE 8642	0.65	13.00	1.15	23.00	NE 9732	0.65	13.00	1.15	23.00
NE 8645	0.65	13.00	1.15	23.00	NE 9737	0.65	13.00	1.15	23.00
NE 8647	0.65	13.00	1.15	23.00	NE 9742	0.65	13.00	1.15	23.00
NE 8650	0.65	13.00	1.15	23.00	NE 9745	0.65	13.00	1.15	23.00
					NE 9747	0.65	13.00	1.15	23.00
					NE 9750	0.65	13.00	1.15	23.00
NE 8712	0.70¢	$14.00	$1.20	$24.00	NE 9763	0.65	13.00	1.15	23.00
NE 8715	0.70	14.00	1.20	24.00	NE 9768	0.65	13.00	1.15	23.00
NE 8717	0.70	14.00	1.20	24.00					
NE 8720	0.70	14.00	1.20	24.00					
NE 8722	0.70	14.00	1.20	24.00	NE 9830	$1.30	$26.00	$1.80	$36.00
NE 8725	0.70	14.00	1.20	24.00	NE 9832	1.30	26.00	1.80	36.00
NE 8727	0.70	14.00	1.20	24.00	NE 9935	1.30	26.00	1.80	36.00
NE 8730	0.70	14.00	1.20	24.00	NE 9837	1.30	26.00	1.80	36.00
NE 8732	0.70	14.00	1.20	24.00	NE 9840	1.30	26.00	1.80	36.00
NE 8735	0.70	14.00	1.20	24.00	NE 9842	1.30	26.00	1.80	36.00
NE 8737	0.70	14.00	1.20	24.00	NE 9845	1.30	26.00	1.80	36.00
NE 8740	0.70	14.00	1.20	24.00	NE 9847	1.30	26.00	1.80	36.00
NE 8742	0.70	14.00	1.20	24.00	NE 9850	1.30	26.00	1.80	36.00
NE 8745	0.70	14.00	1.20	24.00					
NE 8747	0.70	14.00	1.20	24.00					
NE 8750	0.70	14.00	1.20	24.00	NE 9912	$1.20	$24.00	$1.55	$31.00
					NE 9915	1.20	24.00	1.55	31.00
					NE 9917	1.20	24.00	1.55	31.00
NE 9255	0.40¢	$8.00	....	.....	NE 9920	1.20	24.00	1.55	31.00
NE 9260	0.40	8.00	....	.....	NE 9922	1.20	24.00	1.55	31.00
NE 9261	0.65	13.00	....	.....	NE 9925	1.20	24.00	1.55	31.00
NE 9262	0.65	13.00	....	.....					
					NE 52100A	....	.....	$2.60	$52.00
					NE 52100B	....	.....	2.60	52.00
					NE 52100C	....	.....	2.60	52.00

Note 1: The ranges shown are restricted to sizes 100 sq. in. or less or equivalent cross-sectional area 18 in. wide or under, with a maximum individual piece weight of 7000 lb. irrespective of size. **Note 2:** For steels ordered to such ranges, below the size and weight restriction, the average of all the chemical checks must be within the limits specified subject to check analysis variations given in Table 4, Section 10, A.I.S.I. Steel Products Manual. **Note 3:** When acid open-hearth is specified and acceptable, add to basic open-hearth alloy differential 0.25c. per lb. for bars and bar strip and $5 per gross ton for billets, blooms and slabs. **Note 4:** The extras shown are in addition to the base price of $2.70 for 100 lb. on finished products and $54 per gross ton on semi-finished steel, major basing points, and are in cents per pound when applicabale to bars and bar-strip, and in dollars per gross ton when applicable to billets, blooms and slabs. The full extra applicable over the base price is the total of all extras indicated by the specific requirements of the order. The higher extra shall be charged for any size falling between two published extras.

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD ROLLED: Sheets, 400 to 1499 lb.; strip, extras on all quantities; bars, 1500 lb. base; NE alloy bars, 1000 to 39,999 lb.

EXCEPTIONS: (1) 150 to 499 lb. (2) 150 to 1499 lb. (3) 400 to 1499 lb. (4) 450 to 1499 lb. (5) 500 to 1499 lb. (6) 0 to 1999 lb. (7) 400 to 1999 lb. (8) 1000 to 1999 lb. (9) 450 to 3749 lb. (10) 400 to 3999 lb. (11) 300 to 4999 lb. (12) 300 to 10,000 lb. (13) 400 to 14,999 lb. (14) 400 lb. and over. (15) 1000 lb. and over. (16) 1500 lb. and over. (17) 2000 lb. and over. (18) 3500 lb. and over.

[a] Philadelphia: Galvanized sheet, 25 or more bundles.

Extra for size, quality, etc., apply on above quotations.

*Add 0.271c. for sizes not rolled in Birmingham.

**City of Philadelphia only. Applicable freight rates must be added to basing point prices to obtain delivered price to other localities in metropolitan area.

LAKE SUPERIOR ORES

(51.50% *Fe, Natural Content, Delivered Lower Lake Ports**)

	Per Gross Ton
Old range, bessemer, 51.50	$4.75
Old range, non-bessemer, 51.50	4.60
Mesaba, bessemer, 51.50	4.60
Mesaba, non-bessemer, 51.50	4.45
High phosphorus, 51.50	4.35

*Adjustments are made to indicate prices based on variance of Fe content of ores as analyzed on a dry basis by independent laboratories.

FLUORSPAR

Maximum price f.o.b. consumer's plant, $30 per short ton plus either (1) rail freight from producer to consumer, or (2) rail freight from Rosiclare, Ill., to consumer, whichever is lower.

Exception

When the WPB Steel Division certifies in writing the consumer's need for one of the higher grades of metallurgical fluorspar specified in the table below the price shall be taken from the table plus items (1 and 2) from paragraph above.

Effective CaF_2 Content:	*Base price per short ton*
70% or more	$33.00
65% but less than 70%	32.00
60% but less than 65%	31.00
Less than 60%	30.00

PRICES

SEMI-FINISHED STEEL

Ingots, Carbon, Rerolling

Base per gross ton, f.o.b. mill.... $31.00

Exceptions: Phoenix Iron Co. may charge $38.75; Kaiser Co., $43.00 f.o.b. Pacific Coast Ports; Empire Sheet & Tinplate Co., $34.25. Pgh. Steel Co. $33.10.

Ingots, Carbon, Forging

Base per gross ton, f.o.b. Birmingham, Buffalo, Chicago, Cleveland, Gary, Pittsburgh, Youngstown $36.00

Exceptions: Phoenix Iron Co. may charge $43.00; Empire Sheet & Tinplate Co., $39.25, f.o.b. Mansfield, Ohio; West Coast producers, $48.00, f.o.b. Pacific Coast Ports. Pgh. Steel Co. $38.10.

Ingots, Alloy

Base per gross ton, f.o.b. Bethlehem, Buffalo, Canton, Coatesville, Chicago, Massillon, Pittsburgh $45.00

Exceptions: C/L delivered Detroit add $2.00; delivered East Michigan add $3.00. Connors Steel Co. may charge $45.00 f.o.b. Birmingham.

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are $2.00 higher; delivered E. Michigan, $3 higher; f.o.b. Duluth, billets only, $2.00 higher; billets f.o.b. Pacific ports are $12 higher. Provo, $11.20 higher. Delivered prices do not reflect three per cent tax on freight rates.

	Per Gross Ton
Rerolling	$34.00
Forging quality	40.00

For exceptions on semi-finished steel see the footnote on the page of finished steel prices.

Alloy Billets, Blooms, Slabs

Pittsburgh, Chicago, Canton, Massillon, Buffalo, or Bethlehem, per gross ton 54.00

Price delivered Detroit $2.00 higher; E. Michigan $3.00 higher.

Shell Steel

	Per Gross Ton
3 in. to 12 in.	$52.00
12 in. to 18 in.	54.00
18 in. and over	56.00

Basic open hearth shell steel, f.o.b. Pittsburgh, Chicago, Buffalo, Gary, Cleveland, Youngstown and Birmingham.

Prices delivered Detroit are $2.00 higher; E. Michigan, $3 higher.

Price Exception: Follansbee Steel Corp. permitted to sell at $13.00 per gross ton, f.o.b. Toronto, Ohio, above base price of $52.00.

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting, or quantity.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point.

	Per Gross Ton
Open hearth or bessemer	$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.90c.

Wire Rods

(*No. 5 to 9/32 in.*)

	Per Lb.
Pittsburgh, Chicago, Cleveland	2.00c.
Worcester, Mass.	2.10c.
Birmingham	2.00c.
San Francisco	2.50c.
Galveston	2.25c.

9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

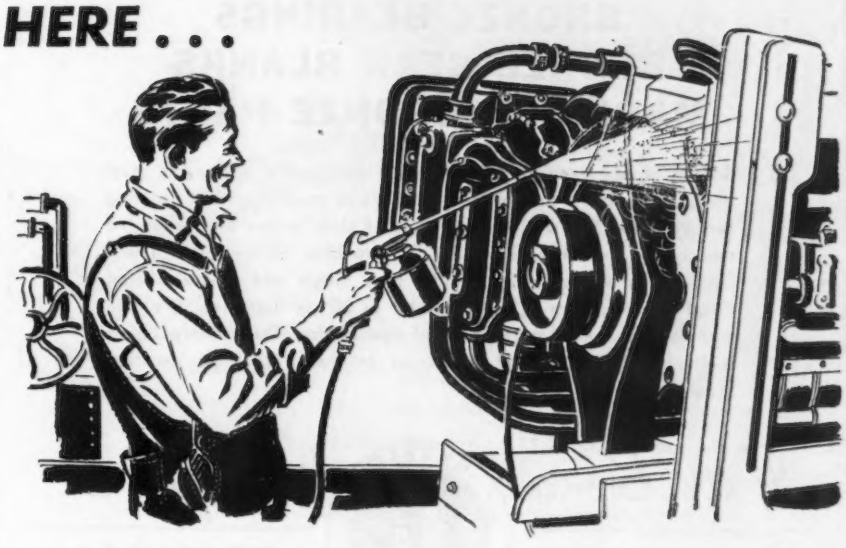
TOOL STEEL

(*F.o.b. Pittsburgh, Bethlehem, Syracuse*)

	Base per lb.
High speed	67c.
Straight molybdenum	54c.
Tungsten-molybdenum	57½c.
High-carbon-chromium	43c.
Oil hardening	24c.
Special carbon	22c.
Extra carbon	18c.
Regular carbon	14c.

Warehouse prices east of Mississippi are 2c. a lb. higher; west of Mississippi 1c. higher.

ONE QUICK APPLICATION— THEN RUST CANNOT ENTER HERE . . .



5 Proven Superiorities

Tectyl SEALS metal surfaces against moisture, eliminating all possibility of rust or corrosion damage for as long as two years. Applied by spraying, dipping, brushing, or flushing, Tectyl leaves a transparent film, permitting inspection at any time without removal. A little Tectyl covers a lot of surface . . . removes easily, quickly, with common solvents.

5 Specialized Types

There's an ideal one to fit each of your special needs--whether it be protecting new materials, or finished products inside or outdoors, or in-production uses. Easy to apply and remove, economical to use, Tectyl protection is *positive*. Tectyl can save you money and man-hours. Write now for Tectyl bulletin with complete application data.

TECTYL STOPS RUST

VALVOLINE OIL COMPANY

Finest Lubricating Oil Since 1866

468 Culvert Street Cincinnati 2, Ohio

Refinery at Butler, Pennsylvania General Offices, Cincinnati, Ohio

New York - Atlanta - Detroit - Chicago - Los Angeles - Vancouver - Washington, D. C.

MACHINED BRONZE BEARINGS
GRAPHITED AND OILLESS
BRONZE BEARINGS
BRONZE GEAR BLANKS
MACHINED BRONZE PARTS

S & H Bronze Bearings are made of cast bronze, under the most modern conditions and of specifications to meet the most exacting requirements. We are manufacturers of plain bronze and graphited and oilless bronze bearings for all branches of the Government Services, as well as plain cylinder type, single and double flange, thrust washers, from 3/8" in diameter to 20" in diameter. We also manufacture special parts made of cast bronze. Our manufacturing methods and equipment enable us to meet the most exacting machining specifications.

If it's Bronze BETTER B BEARINGS *We make it*

INDUSTRIAL BEARINGS

S. & H. Bearing and Manufacturing Co.
340-344 North Avenue, East
Cranford New Jersey

A.I.S.I. HY-TEN S.A.E. N.E.

ALLOY STEELS FOR VICTORY

Scientifically selected to conserve critical alloys and meet the requirements of the AIRCRAFT, ORDNANCE, and MACHINE TOOL industries.

Complete "EARMARKED" stocks of Aircraft alloy steels at Buffalo and Detroit.

WHEELOCK, LOVEJOY & CO., INC.
126 Sidney Street Cambridge 39, Mass.
Cleveland 14, Chicago 23, Newark 5, Detroit 3, Buffalo 10, Cincinnati 32

WELDED PIPE AND TUBING

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills
(F.o.b. Pittsburgh only on wrought pipe)
Base Price—$200.00 per Net Ton

	Black	Galv.
Steel (Butt Weld)		
⅛ in.	63½	51
¼ in.	66½	55
1 to 3 in.	68½	57½
Wrought Iron (Butt Weld)		
⅛ in.	24	3½
¼ in.	30	10
1 and 1¼ in.	34	16
1½ in.	38	18½
2 in.	37½	18
Steel (Lap Weld)		
2 in.	61	49½
2½ and 3 in.	64	52½
3½ to 6 in.	66	54½
Wrought Iron (Lap Weld)		
2 in.	30½	13
2½ to 3½ in.	31½	14½
4 in.	33½	18
4½ to 8 in.	32½	17
Steel (Butt, extra strong, plain ends)		
½ in.	61½	50½
¾ in.	65½	54½
1 to 3 in.	67	57
Wrought Iron (Same as Above)		
½ in.	25	6
¾ in.	31	13
1 to 2 in.	38	19½
Steel (Lap, extra strong, plain ends)		
2 in.	59	48½
2½ and 3 in.	63	52½
3½ to 6 in.	66½	56
Wrought Iron (Same as Above)		
2 in.	33½	15½
2½ to 4 in.	39	22½
4½ to 6 in.	37½	21

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or $2 a ton higher on all butt weld.

CAST IRON WATER PIPE

	Per Net Ton
6-in. and larger, del'd Chicago	$54.80
6-in. and larger, del'd New York	52.30
6-in. and larger, Birmingham	46.00
6-in. and larger f.o.b. cars, San Francisco or Los Angeles	69.40
6-in. and larger f.o.b. cars, Seattle	71.20

Class "A" and gas pipe, $3 extra; 4-in. pipe is $3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger are $45 at Birmingham and $53.80 delivered Chicago, $59.40 at San Francisco and Los Angeles, and $70.20 at Seattle. Delivered prices do not reflect new 3 per cent tax on freight rates.

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes, Minimum Wall. Net base prices per 100 ft. f.o.b. Pittsburgh, in carload lots.

	Seamless Cold Drawn	Seamless Hot Rolled	Lap Weld, Hot Rolled
2 in. o.d. 13 B.W.G.	15.03	13.04	12.38
2½ in. o.d. 12 B.W.G.	20.21	17.54	16.65
3 in. o.d. 12 B.W.G.	22.48	19.50	18.35
3½ in. o.d. 11 B.W.G.	28.37	24.62	23.15
4 in. o.d. 10 B.W.G.	35.20	30.54	28.60

(Extras for less carload quantities)

40,000 lb. or ft., and over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	30%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

PRICES

WIRE PRODUCTS

To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham, Duluth

	Basing Points Named	Pacific Coast Basing Points†
	Base per Keg	
Standard wire nails.....	$2.55	$3.05
Coated nails	2.55	3.05
Cut nails, carloads	3.85	....
	Base per 100 Lb.	
Annealed fence wire	$3.05	$3.55
Annealed galv. fence wire	3.40	3.90
	Base Column	
Woven wire fence*	$0.67	$0.85
Fence posts, carloads ...	.69	.86
Single loop bale ties ...	.59	.84
Galvanized barbed wire**	.70	.80
Twisted barbless wire ..	.70	....

*15½ gage and heavier. **On 80-rod spools in carload quantities.
†Prices subject to switching or transportation charges.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts
(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts:
Base discount less case lots

	Per Cent Off List
½ in. & smaller x 6 in. & shorter	65½
9/16 & ⅝ in. x 6 in. & shorter	63½
¾ to 1 in. x 6 in. & shorter	61
1⅛ in. and larger, all lengths	59
All diameters over 6 in. long	59
Lag, all sizes	62
Plow bolts	65

Nuts, Cold Punched or Hot Pressed:
(Hexagon or Square)

⅛ in. and smaller	62
9/16 to 1 in. inclusive	59
1⅛ to 1½ in. inclusive	57
1⅝ in. and larger	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.

Semi-Fin. Hexagon Nuts	U.S.S.	S.A.E.
Base discount less keg lots		
7/16 in. and smaller	..	64
½ in. and smaller	62	..
⅝ in. through 1 in.	..	60
9/16 in. to 1 in.	59	..
1⅛ in. through 1½ in.	57	58
1⅝ in. and larger	56	..

In full keg lots, 10 per cent additional discount.

Stove Bolts	*Consumer*
Packages, nuts loose	71 and 10
In packages, with nuts attached	71
In bulk	80

On stove bolts freight allowed up to 65c per 100 lb. based on Cleveland, Chicago, New York on lots of 200 lb. or over.

Large Rivets
(½ in. and larger)

	Base per 100 lb.
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	$3.75

Small Rivets
(7/16 in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	65 and 5

Cap and Set Screws	*Consumer Per Cent Off List*
Upset full fin. hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in.	64
Upset set screws, cup and oval points	71
Milled studs	46
Flat head cap screws, listed sizes	36
Fillister head cap, listed sizes	51

Freight allowed up to 65c per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh, 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	$6.00	$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00

HAS SO FEW MOVING PARTS

The use of worm gear speed reduction in Reading Electric Hoists is the reason why there are only four moving parts. This means fewer wearing parts, both gears and bearings and a simpler more compact design. The result is a minimum of maintenance that can be handled by the average mechanic.

It will pay you to investigate the money saving features of Reading Electric Hoists. For full technical information write for Bulletin 1004.

READING CHAIN HOISTS·ELECTRIC HOISTS OVERHEAD TRAVELING CRANES

READING CHAIN & BLOCK CORPORATION 2101 ADAMS ST., READING, PA.

"HERCULES" RED-STRAND WIRE ROPE

You Can Depend On "Hercules" (Red Strand) Wire Rope

Highlights of Quality

1. Acid Open-Hearth Steel Wire
2. Rigid Tests and Inspections
3. Correct Manufacturing Methods
4. Furnished in both the Round and Flattened Strand constructions, in either Standard or Preformed Type.

• • Results are what count, and the performance record of this wire rope continues to make and hold friends.

There is no guess work when you use "HERCULES" (Red-Strand) Wire Rope. It is designed and built to do specific jobs better . . . safer . . . more economically. If you will tell us how you use wire rope, we shall be glad to suggest the construction and type most suitable for your conditions.

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A. LESCHEN & SONS ROPE CO.
WIRE ROPE MAKERS — ESTABLISHED 1857
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SEATTLE • • 3410 First Avenue South

PIG IRON

All prices set in bold face type are maxima established by OPA on June 24, 1941. Other domestic prices (in italics) are delivered quotations per gross ton computed on the basis of the official maxima. Delivered prices do not reflect 3 per cent tax on freight rates.

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phosphorus	Charcoal
Boston	*$25.50*	*$25.00*	*$26.50*	*$26.00*	.....	.....
Brooklyn	*27.50*	*27.00*	.....	*28.00*	.....	.....
Jersey City	*26.53*	*26.03*	*27.53*	*27.03*	.....	.....
Philadelphia (4)	*25.84*	*25.34*	*26.84*	*26.34*	*$30.74*	.....
Bethlehem, Pa.	25.00	24.50	26.00	25.50	.....	.....
Everett, Mass.	25.00	24.50	26.00	25.50	.....	.....
Swedeland, Pa.	25.00	24.50	26.00	25.50	.....	.....
Steelton, Pa.	.....	24.50	.....	.....	29.50	.....
Birdsboro, Pa. (3)	25.00	24.50	26.00	25.50	29.50	.....
Sparrows Point, Md.	25.00	24.50	.....	.....	.....	.....
Erie, Pa.	24.00	23.50	25.00	24.50	.....	.....
Neville Island, Pa.	24.00	23.50	24.50	24.00	.....	.....
Sharpsville, Pa. (1)	24.00	23.50	24.50	24.00	.....	.....
Buffalo	24.00	23.00	25.00	24.50	29.50	.....
Cincinnati, Ohio	*25.11*	*24.61*	.....	*25.11*	.....	.....
Canton, Ohio	*25.39*	*24.89*	*25.89*	*25.39*	*32.89*	.....
Mansfield, Ohio	*25.94*	*25.44*	*26.44*	*25.94*	*32.86*	.....
St. Louis	*24.50*	*24.50*	.....	.....	.....	.....
Chicago	24.00	23.50	24.50	24.00	*35.48*	*$37.34*
Granite City, Ill.	24.00	23.50	24.50	24.00	.....	.....
Cleveland	24.00	23.50	24.50	24.00	*32.42*	.....
Hamilton, Ohio	24.00	23.50	.....	24.00	.....	.....
Toledo	24.00	23.50	24.50	24.00	.....	.....
Youngstown	24.00	23.50	24.50	24.00	*32.42*	.....
Detroit	24.00	23.50	24.50	24.00	.....	.....
Lake Superior fc.	.....	.....	.....	.....	.....	34.00
Lyles, Tenn. fc. (2)	.....	.....	.....	.....	.....	33.00
St. Paul	*26.63*	*26.13*	*27.13*	*26.63*	*39.80*	.....
Duluth	24.50	24.00	25.00	24.50	.....	.....
Birmingham	20.38	19.00	25.00	.....	.....	.....
Los Angeles	*26.95*	....	.....	.....	.....	.....
San Francisco	*26.95*	.....	.....	.....	.....	.....
Seattle	*26.95*	.....	.....	.....	.....	.....
Provo, Utah	22.00	21.50	.....	.....	.....	.....
Montreal	*27.50*	*27.50*	.....	*28.00*	.....	.....
Toronto	*25.50*	*25.50*	.....	*26.00*	.....	.....

GRAY FORGE IRON: Valley or Pittsburgh furnace $23.50

(1) Pittsburgh Coke & Iron Co. (Sharpsville, Pa., furnace only) and the Struthers Iron and Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable. Struthers Iron and Steel Co. may add another $1.00 per gross ton for iron from Struthers, Ohio, plant.

(2) Price shown is for low-phosphorous iron; high phosphorous sells for $23.50 at the furnace.

(3) E. & G. Brooke Co. Birdsboro, Pa., permitted to charge $1.00 per ton extra.

(4) Pittsburgh Ferromanganese Co. (Chester furnace only) may charge $2.20 a ton over maximum basing point prices.

Basing point prices are subject to switching charges; Silicon differentials (not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of base grade which is 1.75 to 2.25 per cent); Phosphorus differentials, a reduction of 38c. per ton for phosphorus content of 0.70 per cent and over; Manganese differentials, a charge not to exceed 50c. per ton for each 0.50 per cent manganese content in excess of 1.00 per cent. Effective March 3, 1943, $2 per ton extra may be charged for 0.5 to 0.75 per cent nickel content and $1 per ton extra for each additional 0.25 per cent nickel.

METAL POWDERS

Prices are based on current market prices of ingots plus a fixed figure. F.o.b. shipping point, c. per lb., ton lots.

Copper, electrolytic, 150 and 200 mesh	21⅛ to 23⅛c.
Copper, reduced, 150 and 200 mesh	20½ to 25½c.
Iron, commercial, 100 and 200 mesh, 96 + % Fe	13½ to 15c.
Iron, crushed, 200 mesh and finer, 90 + % Fe, carload lots	4c.
Iron, hydrogen reduced, 300 mesh and finer, 98½ + % Fe, drum lots	63c.
Iron, electrolytic, unannealed, 300 mesh and coarser, 99 + % Fe.	30 to 33c.
Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe	42c.
Iron, carbonyl, 300 mesh and finer, 98-99.8 + % Fe	90c.
Aluminum, 100 and 200 mesh.	*23 to 27c.
Antimony, 100 mesh	20.6c.
Cadmium, 100 mesh	$1
Chromium, 150 mesh	$1.02
Lead, 100, 200 & 300 mesh,	11½ to 12½c.
Manganese, 150 mesh	51c.
Nickel, 150 mesh	51½c.
Solder powder, 100 mesh, 8½c. plus metal	
Tin, 100 mesh	58¾c.
Tungsten metal powder, 98%-99%, any quantity, per lb.	$2.60
Molybdenum powder, 99%, in 200-lb. kegs, f.o.b. York, Pa., per lb.	$2.60
Under 100 lb.	$3.00

*Freight allowed east of Mississippi.

COKE

Furnace, beehive (f.o.b. oven)	Net Ton
Connellsville, Pa.	$7.00*
Foundry, beehive (f.o.b. oven)	
Fayette Co., W. Va.	8.10
Connellsville, Pa.	8.25
Foundry, By-Product	
Chicago, del'd	13.38
Chicago, f.o.b.	12.60
New England, del'd	14.25
Kearny, N. J., f.o.b.	12.65
Philadelphia, del'd	12.88
Buffalo, del'd	13.00
Portsmouth, Ohio, f.o.b.	11.10
Painesville, Ohio, f.o.b.	11.75
Erie, del'd	12.75
Cleveland, del'd	12.80
Cincinnati, del'd	12.85
St. Louis, del'd	13.85
Birmingham, del'd	10.50

*Hand drawn ovens using trucked coal permitted to charge $7.75 per ton plus transportation charges. **Mo., Ala., and Tenn. producers—$13.35.

★ ★

For

Purchasing Agents, Buyers, Foremen, Superintendents

A BOOK CONTAINING THE FOLLOWING TABLES:

(Size 5½ x 8½)

Mensuration, Trigonometric Functions, Areas, Volumes, Lengths of Arcs, Weights of Materials, Standard Gauges of Sheets, Plates and Wires, Weights and Areas of Square and Round Bars, Weights of High Speed Steels, Gauge Thicknesses, Expansion by Heat, Electroplating Information, Color Codes for Steel, Machineability Ratings, Hardness Conversion Charts, Cutting Speeds, etc.

Send your request to

GENERAL REFINERIES, INC.

27 NORTH 4TH STREET, MINNEAPOLIS 1, MINN.

P. O. BOX 1124

★ ★

PRICES

REFRACTORIES
(F.o.b. Works)

Fire Clay Brick	*Per 1000*
Super-duty brick, St. Louis	$64.60
First quality, Pa., Md., Ky., Mo., Ill.	51.30
First quality, New Jersey	56.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	46.55
Second quality, New Jersey	51.00
No. 1, Ohio	43.00
Ground fire clay, net ton	7.60
Silica Brick	
Pennsylvania and Birmingham	$51.30
Chicago District	58.90
Silica cement, net ton (Eastern)	9.00
Chrome Brick	*Per Net Ton*
Standard chemically bonded, Balt., Plymouth Meeting, Chester	$54.00
Magnesite Brick	
Standard, Balt. and Chester	$76.00
Chemically bonded, Baltimore	65.00
Grain Magnesite	
Domestic, f.o.b. Balt. and Chester in sacks (carloads)	$43.48
Domestic, f.o.b. Chewelah, Wash. (in bulk)	22.0[illegible]

RAILS, TRACK SUPPLIES
(F.o.b. Mill)

Standard rails, heavier than 60 lb., No. 1 O.H., gross ton	$40.00
Angle splice bars, 100 lb.	2.70
(F.o.b. Basing Points)	*Per Gross Ton*
Light rails (from billets)	$40.00
Light rails (from rail steel)	39.00
	Base per Lb.
Cut spikes	3.00c.
Screw spikes	5.15c.
Tie plates, steel	2.15c.
Tie plates, Pacific Coast	2.30c.
Track bolts	4.75c.
Track bolts, heat treated, to railroads	5.00c.
Track bolts, jobbers discount	63-5

Basing points, light rails, Pittsburgh, Chicago, Birmingham; cut spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo. Cut spikes alone—Youngstown, Lebanon, Pa., Richmond, Oregon and Washington ports, add 25c.

CORROSION AND HEAT-RESISTING STEEL
(Per lb. base price, f.o.b. Pittsburgh)

Chromium-Nickel Alloys

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium Alloys

	No. 410	No. 430	No. 442	No. 446
F.Billets	15.725c.	16.15c.	19.125c.	22.375c.
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
Hot strip	17.00c.	17.50c.	24.00c.	35.00c.
Cold strip	22.00c.	22.50c.	32.00c.	52.00c.

Chromium-Nickel Clad Steel (20%)

	No. 304
Plates	18.00c.*
Sheets	19.00c.

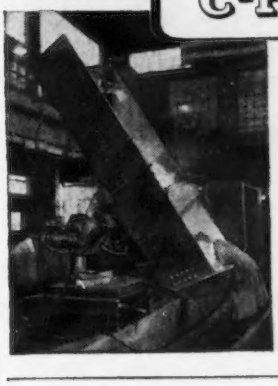
*Includes annealing and pickling.

ELECTRICAL SHEETS
(Base, f.o.b. Pittsburgh)

	Per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

F.o.b. Granite City, add 10c. per 100 lb. on field grade to and including dynamo. Pacific ports add 75c. per 100 lb. on all grades.

C-F POSITIONERS



"Position" Counts Most in This Heavy Welding Operation

● Production welding usually means working on top, bottom and on all sides of the weldment. It means a "quick change" of position should be possible for greater time saving, more efficiency, lower costs and greater safety to men and materials. With C-F positioners a welder can quickly position even the most cumbersome weldments at the press of a button, without crane help or handling crews. With just one set-up of the weldment he can position it easily, speedily and safely, all alone. He can rotate it a full 360° at variable speeds from 0 R.P.M. up, tilt it to 135° beyond horizontal, and can weld, down-hand, all sides, surfaces and angles in the one set-up with larger rods, and fewer passes. All C-F positioners, both stationary and portable, are pedestal mounted to give maximum floor and working clearance and all are adjustable for height.

Write for Bulletin WP-22

CULLEN-FRIESTEDT CO.

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PERFORATED METALS

INDUSTRIAL and ORNAMENTAL

To produce the highest quality of perforated metal as used in the industrial arts and for ornamentation has been the ambition and persistent endeavor of this company. The highest quality best serves the user. We are here to serve you.

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moving heavy casting in the plant of the Union Steam Pump Co. in Battle Creek, Michigan.

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Ezra W. Clark

"99"

Just one year shy of a century of springmaking . . . and believe us, we've seen a lot of life . . . panics . . . wars . . . boom times . . . bum times . . . but we believe in our country and our cause . . . and we stick to our knitting because we want to be

"Everybody's Spring Dept."

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DIV. OF ASSOCIATED SPRING CORP.

BRISTOL, CONN.

SPRINGS · WIRE FORMS · SMALL STAMPINGS

PRICES

Ferromanganese

78-82% Mn, maximum contract base price per gross ton, lump size, f.o.b. car at Baltimore, Bethlehem, Philadelphia, New York, Birmingham, Rockdale, Rockwood, Tenn.

Carload lots (bulk)	$135.00
Carload lots (packed)	141.00
Less ton lots (packed)	148.50

Premium, $1.70 for each 1% above 82% Mn; penalty, $1.70 for each 1% below 78%.

Manganese Metal

Contract basis, lump size, per lb. of metal, f.o.b. shipping point with freight allowed. Spot sales add 2c. per lb.

96-98% Mn, .2% max. C, 1% max. Si, 2% max. Fe.

Carload, bulk	36c.
L.c.l. lots	38c.

95-97% Mn, .2% max. C, 1.5% max. Si, 2.5% max. Fe.

Carload, bulk	34c.
L.c.l. lots	35c.

Spiegeleisen

Maximum base, contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Carloads	$35.00	$36.00
Less ton	47.50	48.50

Electric Ferrosilicon

OPA maximum base price cents per lb. contained Si, lump size in carlots, f.o.b. shipping point with freight allowed to destination.

	Eastern Zone	Central Zone	Western Zone
50% Si	6.65c.	7.10c.	7.25c.
75% Si	8.05c.	8.20c.	8.75c.
80-90% Si	8.90c.	9.05c.	9.55c.
90-95% Si	11.05c.	11.20c.	11.65c.

Spot sales add: .45c. per lb. for 50% Si, .3c. per lb. or 75% Si .25c. per lb. for 80-90% and 90-95% Si.

Silvery Iron

(C/L, Per Gross Ton, base 6.00 to 6.50 Si)

F.o.b. Jackson, Ohio	$29.50*
Buffalo	30.75*

For each additional 0.50% silicon add $1 a ton. For each 0.50% manganese over 1% add 50c. a ton. Add $1 a ton for 0.75% phosphorous or over.

*OPA price established 6-24-41.

Bessemer Ferrosilicon

Prices are $1 a ton above silvery iron quotations of comparable analysis.

Silicon Metal

OPA maximum base price per lb. of contained Si, lump size, f.o.b. shipping point with freight allowed to destination, for l.c.l. above 2000 lb., packed. Add .25c. for spot sales.

	Eastern Zone	Central Zone	Western Zone
96% Si, 2% Fe.	13.10c.	13.55c.	16.50c.
97% Si, 1% Fe.	13.45c.	13.90c.	16.80c.

Ferrosilicon Briquets

OPA maximum base price per lb. of briquet, bulk, f.o.b. shipping point with freight allowed to destination. Approximately 40% Si. Add .25c. for spot sales.

	Eastern Zone	Central Zone	Western Zone
Carload, bulk	3.35c.	3.50c.	3.65c.
2000 lb.-carload	3.8c.	4.2c.	4.35c.

Silicomanganese

Contract basis lump size, per lb. of metal, f.o.b. shipping point with freight allowed. Add .25c. for spot sales. 65-70% Mn, 17-20% Si, 1.5% max. C.

Carload, bulk	6.05c.
2000 lb. to carload	6.70c.
Under 2000 lb.	6.90c.
Briquets, contract, basis carlots, bulk freight allowed, per lb.	5.80c.
2000 lb. to carload	6.30c.
Less ton lots	6.55c.

Ferrochrome

(65-72% Cr, 2% max. Si)

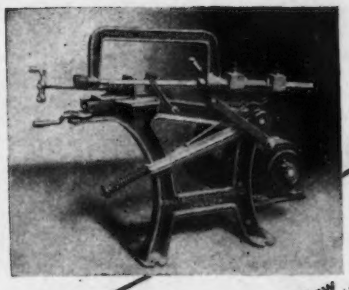
OPA maximum base contract prices per lb. of contained Cr, lump size in carload lots, f.o.b. shipping point, freight allowed to destination. Add .25c. per lb. contained Cr for spot sales.

	Eastern Zone	Central Zone	Western Zone
0.06% C	23.00c.	23.40c.	24.00c.
0.10% C	22.50c.	22.90c.	23.50c.
0.15% C	22.00c.	22.40c.	23.00c.
0.20% C	21.50c.	21.90c.	22.50c.
0.50% C	21.00c.	21.40c.	22.00c.
1.00% C	20.50c.	20.90c.	21.50c.
2.00% C	19.50c.	19.90c.	21.00c.
66-71% Cr, 4-10% C	13.00c.	13.40c.	14.00c.

PRICES

Other Ferroalloys

Ferrotungsten, Standard grade, lump or ¼X down, packed, f.o.b. plant at Niagara Falls, New York, Washington, Pa., York, Pa., per lb. contained tungsten, 10,000 lb. or more...	$1.90
Ferrovanadium, 35-55%, contract basis, f.o.b. producer's plant, usual freight allowances, per lb. contained Va.	
Open Hearth	$2.70
Crucible	$2.80
Primos	$2.90
Cobalt, 97% min., keg packed, contract basis, f.o.b. producer's plant, usual freight allowances, per lb. of cobalt metal	$1.50
Vanadium pentoxide, 88%-92% V_2O_5 technical grade, contract basis, any quantity, per lb. contained V_2O_5. Spot sales add 5c. per lb. contained V_2O_5	$1.10
Ferroboron, contract basis, 17.50% min. Bo, f.o.b. producer's plant with usual freight allowances, per lb. of alloy.	
2000 lb. to carload	$1.20
Under 2000 lb.	1.30
Silcaz No. 3, contract basis, f.o.b. producer's plant with usual freight allowances, per lb. of alloy. (Pending OPA approval)	
Carload lots	25c.
2000 lb. to carload	26c.
Silvaz No. 3, contract basis, f.o.b producer's plant with freight allowances, per lb. of alloy (Pending OPA approval)	
Carload lots	58c.
2000 lb. to carload	59c.
Grainal, f.o.b. Bridgeville, Pa., freight allowed 50 lb. and over, max. based on rate to St. Louis	
No. 1	87.5c.
No. 6	60c.
No. 79	45c.
Bortram, f.o.b. Niagara Falls	
Ton lots, per lb.	45c.
Less ton lots, per lb.	50c.
Ferrocolumbium, 50-60%, contract basis, f.o.b. plant with freight allowances, per lb. contained Cb	
2000 lb. lots	$2.25
Under 2000 lb. lots	$2.30
Ferrotitanium, 40%-45%, f.o.b. 0.10c. max. Niagara Falls, N. Y., ton lots, per lb. contained Ti	$1.23
Less ton lots	$1.25
Ferrotitanium, 20%-25%, 0.10 C max., ton lots, per lb. contained titanium	$1.35
Less ton lots	$1.40
High-carbon ferrotitanium, 15%-20%, 6%-8% carbon, contract basis, f.o.b. Niagara Falls, N. Y., freight allowed East of Mississippi River, North of Baltimore and St. Louis, per carload	$142.50
Ferrophosphorus, 18% electric or blast furnaces, f.o.b. Anniston, Ala., carlots, with $3 unitage freight equalled with Rockdale, Tenn., per gross ton	$58.50
Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., $3 unitage freight equalized with Nashville, per gross ton	$75.00
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., any quantity, per lb. contained Mo.	95c.
Calcium molybdate, 40%-45%, f.o.b. Langeloth and Washington, Pa., any quantity, per lb. contained Mo.	80c.
Molybdenum oxide briquetes, 48%-52% Mo, f.o.b. Langeloth, Pa., per lb. contained Mo	80c.
Molybdenum oxide, in cans, f.o.b. Langeloth and Washington, Pa., per lb. contained Mo	80c.
Zirconium, 35-40%, contract basis, f.o.b. producer's plant with freight allowances, per lb. of alloy. Add ¼c. for spot sales	
Carload lots	14c.
Zirconium, 12-15%, contract basis, lump f.o.b. plant usual freight allowances, per lb. of alloy	
Carload, bulk	4.6c.
Alsifer (approx. 20% Al, 40% Si and 40% Fe), contract basis, f.o.b. Niagara Falls, carload, bulk	5.75c.
Ton lots	7.25c.
Simanal (approx. 20% Si, 20% Mn, 20% Al), contract basis, f.o.b. Philo, Ohio, with freight not to exceed St. Louis rate allowed, per lb	
Car lots	8.75c.
Ton lots	9.25c.



80% of all Small Shop Saws are "Marvels"!

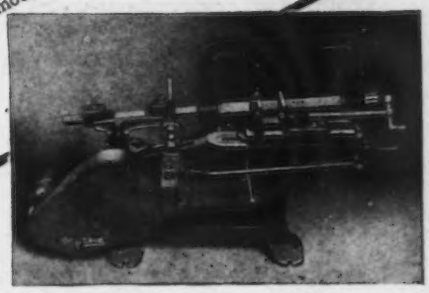
No. 1 Draw Cut Hack Saw Dry cut, 4" x 4" capacity. A sturdy saw well-known for its dependability, economy and invaluable service in the small shop or shop department. Simple and efficient with low original, maintenance, and blade cost.

MARVEL SAWS

No. 2 Draw Cut Hack Saw. Companion to the No. 1 but with a normal 6" x 6" capacity which can be increased to 8" x 8" by shortening the stroke with adjustable crank. The No. 2 MARVEL also has a swivel vise which is removable from the "T" slotted bed. Permitting special fixtures to be mounted. Both machines are available in belt and motor driven models. Motor driven models can also be furnished mounted on portable truck.

Complete Range of Metal Sawing Machines

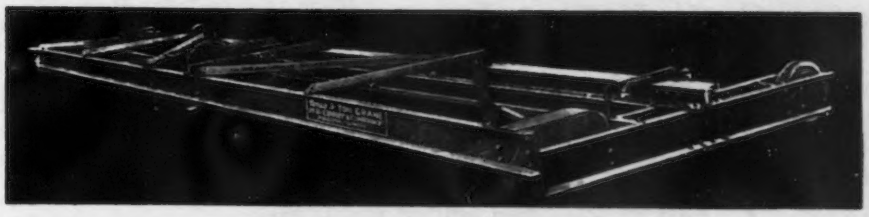
Being the largest exclusive manufacturer of metal sawing machines and blades, both hack saw and band saw type, we have the correct answer to your cut-off problems. Each MARVEL model has a distinct application, so write us and we will send our catalog, price, and recommendation for the saw to fill your requirements most efficiently. MARVEL sawing engineers are also available to discuss and analyze your cut-off work. (Without obligation of course)



ARMSTRONG-BLUM MFG. CO.
5700 W. Bloomingdale Ave., Chicago 39, Illinois, U.S.A.

CONCO 3-Motor Single Girder CAB OR FLOOR OPERATED

ELECTRIC CRANE . . .



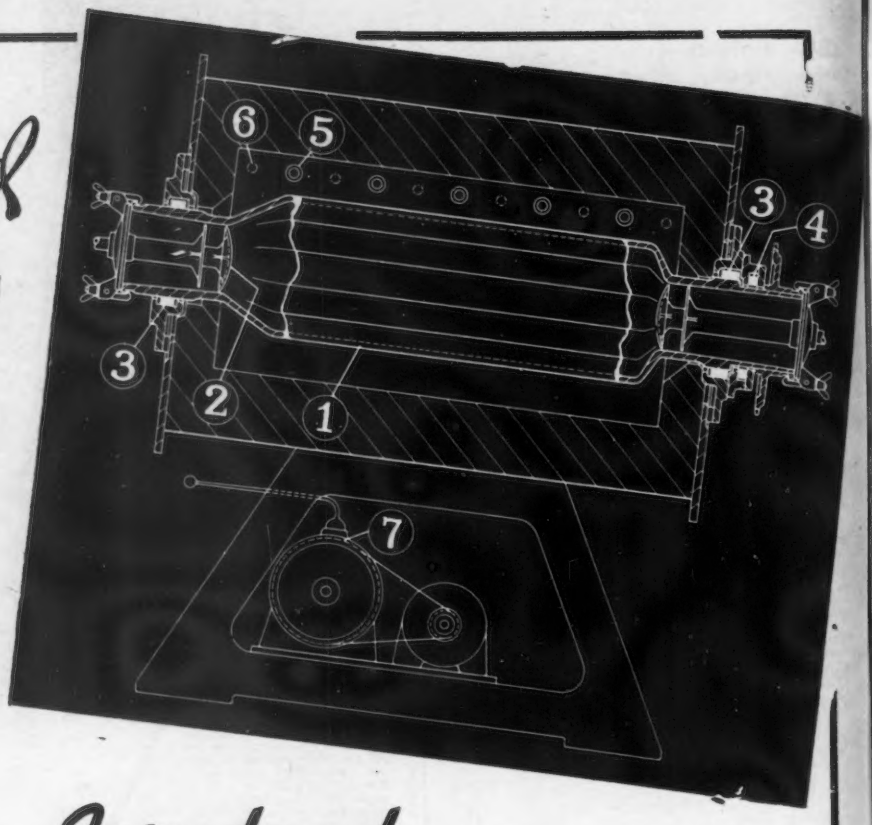
● Available in capacities of one through five tons for floor or cab operation. Simply, ruggedly designed for low first cost and maintenance. Used with Low Headroom Type Hoist, provides for maximum space coverage horizontally and vertically. Effective in even a minimum space. Write for Bulletin 2000.

Write for Bulletin 26000 describing the Torpedo Hoist shown. Three capacities 250 lb. — $139.50, 500 lb. — $149.50, 1000 lb. — $159.50. Heavily, simply built, with Push Button Control. Outstanding in CONCO'S complete line of hand-powered and electric Cranes, Hoists, Trolleys.

CONCO ENGINEERING WORKS
of H. D. Conkey & Co. — 15 Grove St. — Mendota, Ill.
Builders Of Conco Torpedo Electric Hoist

Improved

No. 2GA ROTARY CARBURIZER



This machine is the modern counterpart of our long popular No. 2-B size Carburizer.

It embodies all the most prominent advantages of Rotary Carburizers, which are as follows:

- May be used for atmosphere work without modification.
- Mixing by rotation insures uniformity.
- Charging and discharging labor is minimized by the tilting feature.
- Work may be quenched or slow cooled, as desired.
- Maintenance and handling of boxes is eliminated.

Introduced at the Metals Show

• BOOTH B103 •

Better in Seven Different Ways

1. *(See Diagram)* Twelve-sided retort reduced at both ends is especially suited for handling small articles. The smaller entrance permits a more gradual and thus better discharge for quenching. The new construction permits preheating the carburizing gas before entering the work chamber, thus resulting in more uniform carburizing.
2. Improved small area spacing disc is easier to heat rapidly and uniformly and is much lighter and convenient to handle when charging and discharging.
3. Retort is supported on alloy roller bearings front and rear. This maintenance-free construction permits smooth and continuous rotation with the least amount of power.
4. New roller thrust bearing carries load smoothly in tilted position.
5. New design heat-resisting alloy burners with greater radiating surface are cooler in operation and are clayed into improved refractory tunnels.
6. Burners are arranged in two sections to heat work rapidly and uniformly to carburizing temperature. One section may be shut off to operate uniformly at temperatures as low as 1000° F. for clean hardening, annealing, high drawing, etc.
7. Different classes of work are accommodated by a motor drive with gear shift transmission which gives retort speeds of 1/4, 1/2, 1 and 1½ r.p.m.

Write for literature on the new Carburizer and ask for our complete Condensed Catalog No. 604.

AMERICAN GAS FURNACE CO.

ELIZABETH, NEW JERSEY.